JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

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VOL. CIV., No. 2376.—TUESDAY, NOVEMBER 24, 1908.

EDITORIAL NOTES—GAS, &c.

The Industry's Memorial to Sir George Livesey.

THE suggestion that the life and inestimable work in and for the gas industry of Sir George Livesey should be memorialized in some fit and becoming manner has been before our readers since Oct. 20. Two days later the Council of the Institution of Gas Engineers also resolved that a suitable memorial was desirable; and they delegated the further consideration of the matter to a strong Committee, composed of the President (Mr. Thomas Glover), the Vice-Presidents (Mr. James W. Helps and Mr. Alex. Wilson), Mr. Charles Hunt, and Mr. S. Y. Shoubridge. As a result of their discussion of the form that the memorial should take, upon which to ask the gas industry to provide the necessary funds—as we feel the industry will do most heartily and liberally—the Committee have framed three suggestions; but, before proceeding further, they are anxious to take into their counsel representatives of all branches of the gas industry. It is their desire to elicit opinions upon their proposals and to receive further suggestions; and to these ends they have decided to hold a meeting at the Institution of Mechanical Engineers on Dec. 10. The meeting we are glad to see is not to be confined to members of the Institution; but the Committee "trust that *all companies and corporations owning "gas-works, as well as others connected with the gas industry in "various ways, will be represented.*" That is a broad and open invitation; and it suggests the intention that this shall be a memorial standing in the name of, and representing, the entire industry. That is as it should be, for such a man and such a life's work. We trust, therefore, that as many as possible will avail themselves of the invitation, while those who cannot will send to the Committee—as early as they can before the date—letters of sympathy with the object, and assurance of support to whatever may be the ultimate result. It will also facilitate the arrangements for the meeting if those who intend to be present will notify Mr. Walter T. Dunn, the Secretary of the Institution, to that effect; and anyone who has any fresh idea as to the form the memorial should take will considerably assist in the conduct of the proceedings on the occasion by giving the Committee an opportunity, as early as possible, for prior consideration.

We need not discuss here the question of the appropriateness of a memorial; the dignity of the gas industry as it exists at the close of Sir George's long career alone demands that the work and distinguished character of the most honoured and self-sacrificing servant known in its history should be marked in material and worthy manner. The whole point for the moment is the form the memorial should take. The Committee present for consideration and discussion three suggestions. The first proposes the raising of a fund to establish a Professorship of Fuel and Gas Engineering at the Leeds University; the sum required being not less than £10,000. The second proposal is that a fund should be raised to provide scholarships, to cover the cost of the higher scientific education of deserving young men intending to adopt gas engineering as a profession. Far be it from us to suggest by our words a lack of sympathy with higher educational work in connection with the gas industry; but there is a fear that a memorial that will be such in name only without visible embodiment will not appeal to the industry, and therefore will not secure the necessary financial support, that, for example, in our opinion, the Committee's third suggestion would do. There are other reasons for the view taken; but it would not be altogether seemly to advance them at the present time. The third suggestion is that a building should be erected in some central position in London for the use of members of the gas industry, in which could be incorporated a library, lecture room, and rooms in which conferences and public meetings could be held, and where provision could also be made for the offices for the Council and officials of the Institution. This is the suggestion that commends itself as the one that will be the most popular for the particular purpose in view. A "Gas House" has been talked about for years; but it has never advanced along the road to consummation farther than the distance that rhetoric without action was able to carry it. Now is the opportunity. There can be no two questions about the desirability of some memorial. Let the gas industry have a central home in London worthy its status, as well as of the name, life, and work of Sir George Livesey. Most of the professions have their "homes;" but the gas industry—great and important as it is, with, in its statutory gas undertakings alone, an invested capital of about 130 millions—has been contented to go on in a nomadic sort of way. Let that be altered. A central home would be a power for good for the whole industry; and under its roof the work of consolidating and defending industrial interests could be carried on with greater freedom and effect than it can possibly be under present circumstances. And it would be the home of authority to which eyes within and outside the industry would turn whenever occasion arises.

Gaslight and West Ham Amalgamation.

BY the end of the current week, the full list of Private Bill promotions for next session of Parliament will be before us. The notices that have so far appeared in the "Gazettes" do not suggest that the gas promotions will be numerous; but the Bills, in feature, promise to atone somewhat for the spiritless conditions of recent sessions. Though we must wait a few days for final intelligence to allow of a definite cast of the session's work to be made, one thing can already be positively stated, that the measure the Gaslight and Coke Company are promoting will, in point of importance in more ways than one, stand in the topmost place of the gas promotions. The secret was extremely well kept until within a few days of the publication of the parliamentary notice that the Boards of the Gaslight and Coke Company and the West Ham Gas Company, on the initiative of the former, had arrived at a provisional agreement for amalgamation, including conditions that will, it is avowed, fully defend the interests of the consumers. The terms are now being incorporated in a complete formal agreement, and are not therefore yet available for publication. But they will shortly be laid before the stockholders for ratification, and will be included in the deposited Bill embodying the powers which Parliament are to be asked to endorse. It is now a long time since there has been a Metropolitan Gas Amalgamation; and this project will, if effected, make an important change in what have for long appeared to be conditions that had become established in perpetuity. Whether anything further will emerge from this proposal, if sanctioned, time alone can show.

Sufficient, however, for the present is the scheme now on the table. It is a project which, in a not very remote past, would have been utterly impossible. But the events of the immediate past years, in connection with the larger Company, have removed many obstacles from the path of such a scheme, and have given to it a practicability that, although it can hardly be expected to go through entirely without opposition, should largely efface it. Under a continuance of present conditions, it would not be long before the West Ham Company would, with their expanding business, have to be in Parliament for further capital powers. They have before them, too, the development of the East Ham new works site, upon which there is only a gasholder at present. Beckton lies handy—probably not more than a mile-and-a-half distant—as an economical alternative to that scheme. It will be recollected that the Governor of the Gaslight and Coke Company (Mr. Corbet Woodall) prognosticated at the last meeting of the proprietors that the ordinary price of gas in the Company's area would be reduced by a penny at the end of this year, if there were no unforeseen changes in circumstances. This reduction would make the price in the two Companies' areas uniform. The standard prices vary; but the Gaslight and Coke Company have, under

the terms of their agreement with the London County Council, in association with the re-establishment of meter-rents, a penny reduction to concede. The standard prices will not then be equal; but that is a matter easily amenable to arrangement under the terms of amalgamation. Altogether, there does not, on the face of existing conditions, appear to be much, if anything, to object to, speaking solely from the relative positions of the Companies. The progressive productive and working economies of the Gaslight and Coke Company of recent times have not come to a dead-end; and, under the new order of affairs, they have, through the magnitude of the field of their operations, and the situation of their Beckton works, the prospective fruits of economy to offer to the residents in the West Ham Company's district, while the latter district can offer a developing area of supply to the larger Company. The West Ham Gas Company have a capital of above £1,400,000, including premiums; and the annual output is nearing 1900 millions. It is therefore a considerable undertaking to absorb, but not for a Company with a capital in the neighbourhood of 26 millions. Anyway, taken alone, it will, if carried through, be one of the most notable individual amalgamations in the history of the gas industry. It appears from a consideration of the superficial facts at command—this is, of course, said subject to the terms of the agreement being such as are acceptable—to be a statesmanlike proposal that will inure to the benefit of the Companies and their respective districts. But all concerned will suspend final judgment until more is known.

It will be seen from the digest of the notice of the Gaslight Company's Bill published elsewhere, that they are taking the opportunity of asking Parliament to do what Parliament has been consistently doing of late sessions in all private Gas Bills—reduce the standard illuminating power of the gas. The standard in the Gaslight Company's area is 16 candles, tested by the "Metropolitan" No. 2 burner; and in the West Ham district 14 candles, with the direction in the West Ham Act of 1902 that, "in making tests for illu-"minating power, the gas shall be burned at such a rate as "to yield the maximum light for which the burner for the "time being used in making such tests shall be designed." The amalgamation would make the time particularly favourable for equalizing the illuminating standard of the gas sold throughout the Metropolitan area. At the moment, the Gaslight and Coke Company stand alone in supplying gas above the needless standard of 16 candles. The Company, it will be remembered, have also lately been giving encouragement to thrift among the employees; and they are now requesting confirmation of regulations made, and power to make further regulations, with respect to the nomination of persons to transfer stock held by employees of the Company, and to make provisions with respect to the handing over and transfer of any stock or moneys left in the hands of the Company on account of shares of employees in the profits of the Company. Is this something more than a matter of simple regulation? Is it the first step in preparing the way to a scheme of an imposing character in which the workmen will be beneficiaries? Another interesting point in the measure will be the further power the Company find desirable in connection with prepayment meter supply, and "the mode of "procedure for the recovery of moneys payable with respect "to any such supply, and the fittings let on hire in connection "therewith." The other miscellaneous items of the Bill have little more than domestic interest attached to them.

The Street Lighting Business.

In looking through the technical publications of this and other countries touching upon the subject of artificial illumination, one is struck by the considerable attention that is now being paid to the question of street lighting. We see it particularly in America, in Germany (especially Berlin), and, in more aspects than the purely scientific ones, in this country. But with it all, there appears to be no settled opinion as to the superior means and methods. Predilection goes a long way in the framing by technical advocates of cases for one form of illuminant or the other, as instanced by Dr. Bloch, of Berlin, whose latest investigations are noticed elsewhere this week. The difficulty is to get a skilled, unbiased opinion, under any set of circumstances. The gas engineer and the electricity engineer also naturally plead their respective causes; while many municipal authorities to-day are—and more the pity—persuaded in considerable measure as to choice not by efficiency, not by cost, but by the question of ownership of the gas and electric lighting undertakings. In the competition between gas and electricity, the widespread ownership of the latter by municipalities has done more than anything else to aggravate the commercial conflict. In most cases where there is joint ownership, or better still in those cases where the competing supplies are being worked by private enterprise, there the competition has mostly been conducted on fair and square lines. Where there has not been the influencing bias of ownership of the one supply and not of the other, there the local authorities have, as a rule, dealt with the question of street illumination from the purely business point of view, and, in the ratepayers' interests, sought for the illuminant that, under the special circumstances of the case, in their lay judgment, gives the best value for money. Where this rule has governed selection, gas companies have not had much of which to complain; they have indeed had a very good share of the business.

The City Corporation are among those who have maintained open minds on the subject; and the fact that a deputation has been authorized, at an expense of some £200, to make a tour to inspect the systems of street lighting in vogue in representative cities, shows conclusively that the centrally suspended flame arc lamps in Cannon Street have not satisfied the City Fathers that these are at the summit of the means at disposal to-day for the rational, efficient, economical, and safe lighting of our City streets. If efficiency could be said to be represented by a large volume of concentrated light, then there might be much to be advanced in favour of these lamps. All local authorities, however, do not appear to study efficiency so much as show for the main avenues in their areas of jurisdiction; and it is the business of gas suppliers not only to advise, but to meet demands that may be contrary to their advice. Those local authorities whose preference lies in the direction of large light sources will soon have in Fleet Street a demonstration of high-pressure inverted burner gas-lamps of a much more economical kind than those in Queen Victoria Street, and those of which such good report is made from Berlin, and which have so considerably gained the favour of the Municipality there. At the moment of writing, workmen of the Gaslight and Coke Company are running the high-pressure main down the centre of the roadway in Fleet Street.

Travelling through the country, the differences in street illumination by gas in various towns are extraordinarily striking. In some places, system and upkeep of lamps are studied with excellent effect; in others, there is the evidence in every thoroughfare of a phlegmatic interest in this public service. The lighting authorities must take their share of responsibility for this. Many of them will not spend money on improvement; and there are not a few instances, where they are the owners of the electricity undertaking and not of the gas undertaking, of actual obstruction rather than allow gas, through the public lighting, to obtain a good name as an efficient street-lighting agent. At the same time, in some cases where there is indifferent street lighting, the thought cannot be completely banished that the managements of the gas undertakings do not bestir themselves to do all that might be done to improve it; things being permitted to run in free-and-easy fashion in the same old rut year in year out. In such places the value of a good name in the public service, as an advertisement, and in the hour when the competitor forcibly assails, is overlooked. In such places, where there has been neglect and indifference in the matter, it is only when the competitor comes that torpor gives place to a measure of activity, and then the obvious fact is hailed with merited derision. To-day there should not exist a single town where the customs and practices of our forefathers in public lighting are tolerated. Every effort should be made, even to the extent of some sacrifice, to escape, in the main streets, from the antiquated lantern, and from the long distances between lamp column and column, which distances have nothing to defend them except (in this instance) a reproachable custom. There should be an intelligent study of the requirements of open spaces and main thoroughfares; the latest that improvement in gas lighting has to offer should be demonstrated in suitable position; and, above all, the flickering, wasteful, inefficient flat-flame burner should be a thing of the past in the streets, and not remain as a memorial of the fact that gas has not always been the efficient agent that it is now.

Reproof in this matter has anything but universal applicability; but we do wish, and wish most sincerely, that there were fewer places where there is to be found perpetuation of antiquated means and of conventional method. The advances of electric lighting have been many; and they

are the victorious issues of perseverance in research and of practical application. But praiseworthy as the result has been, there is a big gulf yet to be bridged between the metallic filament lamp and the incandescent gas mantle for the former to attain an efficiency and economy corresponding to the latter, used with burners of modern design. The metallic filament lamps, however, have revived the question, among municipalities owning electricity undertakings, of electrically lighting the side streets in which cables are laid. There are many municipal electric lighting departments that would be very glad of the support of this custom at an enhanced expense to the ratepayers; and there are many municipal and even company electricity undertakings that would be pleased to do the lighting without profit for the sake of the advertisement. Trials are being made with metallic filaments for the purpose in many places; loans are being applied for to carry out plans of conversion (in cases to the loss of both ratepayers and electricity undertaking); and altogether there is an activity in this direction that must —we say it most emphatically—be met by similar activity. Power in local administration and ownership of the electricity undertakings are being used unfairly, and with unbending energy, in the competition with the local gas undertaking. We have seen what has happened at Tunbridge Wells; what is being proposed at Hastings; and what has been done at Ilford. It is suggested, too, that in Marylebone the whole of the streets in which there are cables should now be lighted by electricity. These are only instances. Capital, running costs, and efficiency do not count where there is municipal ownership. It is high time that gas companies did something in protest and exposure of this phase of municipal ownership; and we hope the Committee of the Gas Companies' Protection Association are already well at work with the inquiry they, in their last report, proposed to institute into this matter of unfair competition. But all municipal authorities are not guilty of neglect of their primary duties, and of the interests of the ratepayers; and they retain an open mind on such questions as the one under consideration. We were the other day pleased to see, for instance, the announcement that the Lighting Committee of Hampstead had had under consideration the advisability of converting 100 incandescent gas-lamps to metallic filament lamps, but "were not at present satisfied that the proposed change "would be advantageous to the Council."

We do not know of any place where, when economy and efficiency, including reliability, are considered (unless, of course, the price of gas is immoderately high and the cost of electricity is inordinately low), the metallic filament lamp can compete with incandescent gas lighting. The only way in which there can be comparison of metallic filament lamps with ordinary incandescent gas lighting is by reducing the charge for electricity down to (say) 1d. or under per unit—representing loss to the electricity undertaking, and reduced illuminating power for the ratepayers. The capital costs for conversion are ignored; and as to the other costs, we find from actual experience in one district in London (the "Electrician" can vouch for the accuracy of the figures) that "Osram" lamps of 50 Hefner units, working on 210 volts, each use 248·22 B.T.U. per annum; and this consumption is only charged at 1d. per unit—thus representing £1 0s. 8¼d. per annum. The average life of the lamps is 720 hours; and the average number of lamp changes per annum, nearly 5·5. Renewal charges therefore represent an expenditure of £1 2s. 4d. The cost of globe renewals per lamp per annum is 1s.; and trimmers' and assistants' wages per lamp per annum, 15s. Here we get a total cost per lamp per annum of £2 19s. 0¼d., for only 50 Hefner unit lamps, with electricity merely charged at 1d. per unit, and without calculating the costs incurred in the conversion. If the charge for electricity were only 2d. per unit, the total cost of these 50 Hefner unit Osrams per annum would be approximately £4.

We have to march with the times; and we have to meet the competition to which time gives birth. It is settled that for main streets public lighting authorities like large light sources, and for side streets they are now making all sorts of excuses for handing over the lighting to their own electricity concerns. These are the conditions that have to be met; and the gas industry has at hand all that is necessary —with fair field and no favour—to meet them. If local authorities want high-power lamps in main shopping streets, arrangements must to-day be made, to compete with flame arc lamps, for running a high-pressure main down those streets; and then also use the main for competing with the electric arcs suspended outside shop windows. In the competition with the metallic filament lamp favoured with electricity at a "next-to-nothing" price, the best and most economical of modern burners must be used, and upon them careful attention must be bestowed. This all costs money, so does the loss of business. There must be no shirking the matter. The struggle for possession of the main part of the public lighting has set in earnestly in many places. Now is the best time to deal with the matter, and let it be dealt with —seriously.

The Plot that Failed.

THE plot the parties to which were the Government and the Progressives of the London County Council, and the fulfilment of which was to be the placing under the London County Council of the entire electricity supply of London and its environs at a more or less remote date, has in great part failed. The ambitions of the Progressives are boundless, and are entirely destitute of prudence. In this case, they have again over-reached themselves. They gained the ear of the Board of Trade and of the Government; and resolutions by the House and a remarkable report by the former were the result—the main features being a series of instructions to the Committee considering the London and District Electricity (Power and Bulk) Supply Bill and the other two London Electricity promotions to arrange for the insertion of purchase powers, on behalf of a County Council who do not want them, at the ordinary statutory period or earlier on certain terms. Fortunate at this time are the London ratepayers in having a majority on the County Council who are opposed to the ratepayers incurring large financial risks in such a speculative business as an electricity power and bulk undertaking, serving in an area larger than the Administrative County of London. The proposals made by the Board of Trade were directly antagonistic to the policy of the present ruling majority of the County Council, who are firmly satisfied that such venture should be the subject of private enterprise, with proper public supervision. No one can tell what the future has in store; and the permissive character of the proposals of the Board of Trade in regard to purchase would, in the event of the Progressives getting the upper hand by even the narrowest majority, have enabled them to, at a comparatively early date—before prospects had been proved, and before much of the estimated expenditure of 6 millions sterling on the power and bulk scheme had been made—dump this scheme on to the ratepayers, and irrevocably commit them to one of the hugest pieces of folly that ever had conception in human brain. The Parliamentary Committee of the County Council, however, reported strongly against the Council having foisted upon them, by any political cabal, powers which were hostile to well-considered policy; and the Council confirmed the views of the Parliamentary Committee last Tuesday by 66 votes to 43.

It was a coincidence that the following day, the House of Commons Committee (presided over by Sir Luke White), who had been spending no less than fifteen sittings hearing evidence for and against the London and District Bill, required only a quarter of an hour's deliberation to declare the preamble of the Bill not proved. The present Government have done some strange things in their time; and it would have been one of the strangest to force upon the unwilling central authority of London purchase powers over a large trading concern, involving many millions of capital, and speculative to the extreme. Is it at all possible that the emphatic declaration of this unwillingness by the Council had as much effect upon Sir Luke White's Committee in arriving at their decision as the volumes of evidence that they had had poured into their ears during the preceding weeks? Whether or not it be so, it is perfectly clear that, as each session comes along with its new power and bulk scheme, the case constructed in favour becomes more and more gossamer. The enervation from which London manufacturers are supposed to be suffering through the absence of an electricity bulk and power scheme does not show itself on the surface, nor by their testimony in favour of such schemes. They do quite as well as other people when trade is good, and suffer the set-backs of depression precisely the same as in those areas where there are electricity power companies already at work. If London manufacturers want electricity for power purposes, they can have it now from established undertakings at a price very much the same as that put forward on behalf of the embryonic power companies; and they do not decline the supply from any conscientious scruples

as to ratepayers or lighting consumers or both bearing part of the capital and other costs of production and distribution. The necessity of a power and bulk scheme for London—whether of municipal or private origin—has not been proved; and now never will be, though one may some day be squeezed through Parliament.

The scheme, however, is ended for this session that was intended to place a big electricity generating-station next door to the Coalite Company's prospective plant at Barking. There cannot be much joy in the offices of the British Coalite Company to-day, if their hopes for the disposal of the gas to be produced at Barking in turning out their partly carbonized coal have been resting for months past, as rumour has had it, on the success of this electricity scheme. What will now become of the gas to be produced at the Barking works? The Company are very unfortunate. Something turns up to block their infantile career at every fresh move. Those for whom there must be the greatest commiseration are the people who have invested money, as the result of those skilfully drawn tales told, in a form that suggests to the reader the editorial authority of "The Times" and other papers, and in such plausible style that the embodied imagination can only be extracted by the expert in carbonization and in its products. The Coalite people have unquestionably got upon the right side of the papers that publish their advertisement articles; for nothing will move them to notice skilled criticism of their contents. However, we have now to wait for developments to see what the Coalite people will do next in finding a market for their gas from Barking. Time is being lost; and if it is a question of parliamentary powers—either self-sought, or through the London and District Electricity Supply Bill—the lesson of this session is that there is tremendous hazard, even with an indulgent Government in power.

Motor Buses and Street Lamps.

The unwelcome attentions of motor buses to lamp columns, and the disastrous effects upon the latter of those attentions, have been before the Courts somewhat frequently of late; and certain of the County Court Judges, it has been noticed from time to time, have got it into their heads that the owners of lamp columns so damaged (who by-the-by cannot afford to keep a sentinel at every post) must prove that there has been negligent driving before they can recover the damage occasioned. The dictum was as awkward as it was unjust. But now we have got into the High Court with the matter, in a case in which the District Council of Barnes and the London General Omnibus Company were concerned. The dispute has been settled there by Mr. Justice Bigham and Mr. Justice Walton giving a decision in favour of the owners of street lamps; and their Lordships have declined an application for leave to appeal. For the future, the onus will rest upon owners of motor buses and other conveyances to show that, when they damage a street lamp, reasonable care was exercised in driving. Their Lordships showed distinctly that they were not disposed to do anything to encourage motor buses to continue their playful but expensive and inconvenient antics along the highway.

A "Sound" Investment.

Caution has been given in these columns on previous occasions against the innocent-looking advertisements that appear in the daily or weekly papers, offering shares for sale, and purporting to have been inserted by private persons. There is a *bonâ fide* appearance about these advertisements; but in some cases investigation has proved that appearances are deceptive, and that certain of these advertisers have had a not very remote connection with that centre of company-promoting activity, Cannon Street, No. 99. The advertisement suggesting a private treaty sale seems the last resource for unloading on unsuspecting individuals unapplied-for capital in unpromising concerns. We are obliged to Mr. E. K. Burstal (of Messrs. Stevenson and Burstal) for calling attention to an advertisement in "The Times" of the 10th inst., which we assert would come under the category of what the Lord Chief Justice described as "specious pretence" (*ante*, p. 469). The advertisement is addressed to investors in water shares, and announces that "a sound investment, yielding 7 per cent. yearly, increasing in value, can be secured upon exceptionally favourable terms." Mr. Burstal's investigation of this advertisement, it will be seen, discloses that in every limb of the quoted sentence, there is "specious pretence." In the first place, it is not a "sound" investment that is offered, because it refers to the North-East Lincolnshire Water Company, which has not so far paid a dividend. The only way in which the shares for sale will yield 7 per cent. yearly is by a guarantee in joint names for three years. This only transpires in the course of the correspondence. Then there are grave doubts as to whether the investment is increasing in value, seeing that there will be great joy if the shares can be palmed off on anyone foolish enough to buy them at a 25 per cent. discount from nominal value, with a guarantee of 7 per cent. for three years! We do not regard these as "exceptionally favourable terms" for the shares—save to the sellers. The whole advertisement is misleading, and designedly so. Mr. Burstal has neglected one thing before publishing the correspondence, and that is to ascertain the names of the guarantors of the 7 per cent. yearly. Details of this kind are of especial interest to us at the present time. However, as we write, memory goes back to the fact that the North-East Lincolnshire Water Company have before come under notice in these pages. On June 11, 1907, this paragraph appeared:

> The North-East Lincolnshire Water Company are issuing, by tender, £13,000 of 6 per cent. preference stock, at the minimum price of £9 per £10 stock. That is an attractive feature, which is accompanied by the further sop of a full six months' interest on Aug. 1 next. Less attractive features to some investors will be that the Finance and Construction Company, Limited, are interested parties, and that this Company's generosity, in view of certain consideration in one of the agreements with the Water Company, has led them to guarantee the payment of the interest upon the preference stock for two years from Feb. 1 last. The guarantee, we imagine, is no measure of the consideration.

On page 715 of the same issue, there will also be found an article that is appropriate to the present comment, under the title "Hints on Share Selling." From that article it will be seen that in times past there have been other "sound" investments going at rubbish prices.

The Travels of an Idea.

One never knows the extent of the influence of one's acts. When some years ago Mr. H. O. Carr, the Engineer of the Wandsworth and Putney Gaslight and Coke Company, sat down and prepared a number of circulars that, through sketch and wording, were designed to inform the householder and tradesman that for every lighting and heating appliance the electrical people could put forward, the gas industry had something superior in points of efficiency and economy to offer, he did not dream that—at any rate—one of these circulars would find its way out to the Far East, possibly *viâ* a route that did not associate its origin with Wandsworth, and be used there, with the necessary change of wording (though not in every particular), to enlighten Chinese householders. The circulars produced by Mr. Carr, though the copyright was registered, have been largely copied—in every detail as to design of fittings, and with only the essential change in wording—in, to his knowledge, many places without so much as "by your leave." But on reading Mr. Maurice Graham's interesting article last week on Hong Kong, and finding two of the fittings designs (to the slightest details) of one of his circulars accompanied by strange hieroglyphics, which he discovered by the translation at the bottom represented in part the wording on the original circular, Mr. Carr must have felt elated at the world-wide appreciation of his work, and the part he is taking in the spread of the gospel of gas. The series of these circulars that he drafted years ago are as applicable to-day as ever, with the exception that the figures brought up to date show, through price reduction and improved efficiency, still further economy. The Chinese reproduction gives an opportunity, of which we are glad to avail ourselves, of calling attention to the authorship of these interesting illustrated "comparison" circulars.

The Brentford Gas-Testing Case.—At a recent conference of authorities concerned in the decision of the High Court of Justice in the above-named case, which was reported in the "JOURNAL" for June 9 last (p. 646), it was decided to approach various local authorities throughout the country who might be affected by the judgment, with a view to a joint application being made to the Board of Trade to take such steps as may be necessary "to revise the standard of the illuminating power of the gas supplied by different companies, and the description of the burner to be used in testing the same."

MEMORIAL TO SIR GEORGE LIVESEY.

On behalf of the Committee of the Institution of Gas Engineers who have this matter under consideration (see *ante*, p. 251), Mr. W. T. Dunn sends the following statement for publication :—

A meeting of the Committee appointed to consider the question of the memorial to the late Sir George Livesey was held on the 19th of November at the Institution of Gas Engineers, when three suggestions were considered as possible ways in which the memory of Sir George could be perpetuated.

1.—That a fund should be raised to provide a professorship of Fuel and Gas Engineering at the Leeds University, for which a sum of not less than £10,000 would be required.

2.—That a fund should be raised to provide scholarships to cover the cost of the higher scientific education of deserving young men intending to adopt gas engineering as a profession; the number of these scholarships depending, of course, upon the sum contributed.

3.—That a building be erected in some central position in London for the use of the members of the gas industry, which would contain a library, lecture-room, and rooms in which conferences and committee meetings could be held, and where provision could also be made for offices for the Council and officials of the Institution of Gas Engineers.

The Committee think it desirable to ascertain the opinion of all those interested in the scheme upon these proposals, and also to elicit further suggestions; and they have therefore decided to hold a meeting at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, Westminster (by the kind permission of the Council), on Thursday, the 10th of December, at 2.30 p.m., at which they trust all gas companies and corporations owning gas-works, as well as others connected with the industry in various ways, will be represented.

In order that suitable arrangements may be made, the Committee will be glad if those wishing to be present will kindly notify same to Mr. Walter T. Dunn, the Secretary of the Institution of Gas Engineers, at No. 39, Victoria Street, Westminster, before the 7th of December.

It would help the Committee very much if any one having any suggestion to make would communicate with Mr. Dunn as early as convenient before the meeting.

OBITUARY.

GEORGE RANKIN LOVE.

We regret to record the rather sudden death, last Tuesday, of Mr. George R. Love, the Engineer and Manager of the Guildford Gas Company. Those of our readers who attended the meeting of the Southern District Association of Gas Engineers and Managers on the 5th inst. will remember that Mr. Love was present, and was elected Vice-President. He was by no means well at the time, and was, indeed, suffering from an internal complaint. He was taken seriously ill on Monday last week, and passed away about eleven o'clock next night, leaving a widow, a son, and a daughter.

At the outset of his career, Mr. Love was under Mr. George R. Hislop, of Paisley, whose Assistant he became. In 1891 he left Scotland to take up his abode in the Sister Isle, where he had obtained the appointment of Manager of the Dundalk Gas-Works. Soon after occupying this position, he joined the North of Ireland (now the Irish) Association of Gas Managers, was soon placed on the Committee, and on two occasions—in 1896 and 1898—was elected Vice-President. He joined the Gas Institute in 1893, and in due course passed into the Institution. He was an associate member of the Institution of Civil Engineers; having been elected in 1896. Early in 1900, he was selected to succeed Mr. E. P. Reilly as Engineer and Manager of the Guildford Gas Company. On taking up his duties he turned his attention to improving the carbonizing arrangements, and introduced first regenerative retorts, and subsequently inclined ones set at an angle of 45°—the "forty-fives" with which his name has ever since been associated. He joined the Southern District Association at the autumn meeting in 1900; and on the corresponding occasion six years later, at which his Chairman (Mr. F. F. Smallpiece) was present, he gave his colleagues an account of his experiments. His vertical retort was provided with vanes for carrying the heat to a place as near the centre of the mass of coal as possible. As this retort did not yield the desired results, he tried one set at 60°, and afterwards another at 45°. This was so satisfactory that he put up a bed of eight, which were self-fed, set at this angle. He had given considerable attention to the subject of vertical retorts, and made an interesting contribution to the discussion on the papers read by Mr. Thomas Glover and Herr Körting at the meeting of the Institution of Gas Engineers two years ago. In the course of his remarks, he stated that the conclusions he had arrived at, after three years' experience with vertical retorts, were quite different from those laid down in the papers; and he had quite given up the idea of a vertical retort, as he did not think it was possible to make pure coal gas alone from one. It is greatly to be regretted that he was not spared for further useful work in connection with the gas industry; for he was in the prime of life.

The burial took place in Stoughton Cemetery last Saturday afternoon, in the presence of a large gathering. The first part of the service was held in the Congregational Church, North Street, with which the deceased had been actively identified as a Sunday School teacher. The capacious building was fairly well filled. The service was conducted by the Rev. A. Cowe; and there were present: The Chairman, Mr. F. Smallpeice, J.P., and three other Directors of the Gas Company, with the Auditors, and Mr. William Titley, the Secretary. The Southern District Association of Gas Engineers were represented by Mr. Norton H. Humphrys (President), Mr. James Paterson (Vice-President), Mr. A. F. Browne (Hon. Secretary), Mr. Samuel Carpenter, and Mr. H. Buckley. Unfortunately, the notices for the date of the funeral could only be issued the day before; and many did not receive them till late in the evening. But for this fact, there would have been a much larger representation of the Committee, as evidenced by letters of regret and apology that have been received. About sixty men employed by the Gas Company were present, as well as representatives of the Guildford Adult School, Temperance Lodge of Guildford, and the Guildford Education Committee, besides the chief mourners and friends. The Minister referred to the respect in which Mr. Love was held, both in his profession and in the town; and afterwards a procession was formed and most of those named above followed the remains to the cemetery. The coffin bore the inscription—

George Rankin Love,
Died Nov. 17, 1908,
Aged 50 years.

The death occurred recently, at the age of 66, of Mr. Isaac Williams, one of the best-known tradesmen of Skipton, and the Chairman of the Water Committee of the Urban District Council.

The death occurred yesterday morning of Sir Ralph Littler C.B., K.C., the well-known Chairman of the Middlesex Quarter Sessions. Deceased was called to the Bar at the Inner Temple in 1857; and he had a long and lucrative career. On the death of Mr. Pope, he became the leader of the Parliamentary Bar. Apart from being professionally connected with the gas industry, he was Deputy-Chairman of the Southgate and District Gas Company, and a Director of Messrs. Head, Wrightson, and Co.

PERSONAL.

The "Yorkshire Observer" understands that Mr. John Laycock has handed in his resignation as Manager of the Keighley Gas-Works, and that the matter came before the Corporation Gas Committee at their meeting last Tuesday. The Committee, however, passed no resolution accepting the resignation; and it is, our contemporary remarks, possible that Mr. Laycock will be requested to reconsider his decision. Mr. Laycock has been at Keighley more than forty years; and the present Corporation gas-works at Thwaites, which were completed in 1876, were designed and erected under his supervision.

Mr. E. Brooke, who has been in the employ of the Birmingham Gas Department for two years, has, we learn, been appointed to the position of Works Engineer at the Adderley Street Station of the Corporation, rendered vacant by Mr. J. H. Darrah's acceptance of the post of Assistant-Engineer at Buenos Ayres, as recorded in last Tuesday's "Journal." Mr. Brooke served his apprenticeship with Messrs. R. Dempster and Sons, of Elland, and obtained much experience of the erection and starting-up of new works. In Birmingham, he has been chiefly engaged in the supervision of the work of the coal-testing plant. He is a double medallist, ordinary and honours, of the City and Guilds of London "Gas Manufacture" examinations. The resignation of Mr. Darrah (who, by the way, was born in 1881, not 1871, as mentioned last week) was accepted by the Gas Committee with regret; and they conveyed to him their good wishes for his future.

Next Saturday, Mr. J. C. Watson, the Engineer and General Manager of the Oriental Gas Company, will commence his return journey to Calcutta, where he hopes to be before Christmas. He was present at the meeting of the shareholders of the Company on Wednesday last, and there had a happy reception. Complimentary reference was made to his services by the Chairman (Mr. R. Hesketh Jones); and his words were cordially endorsed by the shareholders. Mr. Watson's sojourn at home on this occasion has been comparatively brief; and it has been largely occupied in the Company's business—that being the main purpose of his home-coming. The public lighting contract of Calcutta, as the report of the meeting of the Company shows, is now under consideration by the authorities; and Mr. Watson has taken the opportunity, during his journeyings on this occasion, to visit many cities and towns to study what is being done in respect of street lighting. He goes back with quite a store of knowledge on the subject—among it the impression of a marked divergence in the character and quality of the lighting that obtains, and an opinion that there is no genuine reason, in most cases, for the divergence from a high standard.

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 575.)

BUSINESS on the Stock Exchange last week was on a much reduced scale, and devoid of any feature of importance. The continued delay of progress in a settlement of the Near Eastern difficulty produced a feeling of languor, and at times markets became almost inanimate. The upshot of the Kaiser-Chancellor interview had a good effect; but more support than this was needed to preserve prices from general decay. The opening on Monday was weak, in view of Continental affairs; and markets of all sorts were dull—Consols losing $\frac{3}{16}$. Tuesday became cheerful on the news from Berlin, and American prices lent a helping hand. Consols and the rest recovered what they had lost. Wednesday opened fairly, but business fell so quiet that things could not avoid drooping; and Thursday suffered from general inanition. Friday was dull, but was not overborne by realizations; and the calm of Continental financial centres was rather encouraging. Saturday was extremely quiet, with hardly any movement. But what little there was tended downward. The Money Market at first was very easy, but later on it began to gather strength, and at the close was much firmer. In the Gas Market further progress was made in the constriction of prices; and some quotations which had not been fully treated the previous week were now laced-in tighter. The interesting feature of the week was the announcement on Friday of an amalgamation scheme between the Gaslight and Coke and the West Ham Companies, upon terms favourable to the latter. With its usual alacrity to seize a new point and make the most of it, the Market immediately ran the price up as if the scheme were a *fait accompli*. Apart from this, quotations in general were firm, and the volume of business was bigger. In Gaslight and Coke issues, the ordinary was very brisk and buoyant; and transactions ranged from 99¼ to 100½ (a rise of 1¼). The secured issues also were active and rising; the maximum being done at from 88½ to 89¼, the preference at from 106¼ to 107, and the debenture at from 85½ to 86½. South Metropolitan was less active and easier, changing hands at from 119½ to 120¼. Commercials were hardly touched—a deal in the 4 per cent. at 107¾, and one in the 3½ per cent. at 103¼ free, being the whole. The Suburban and Provincial group were also very quiet. Brentford old marked 247, British 42 special, Lea Bridge 120½, and West Ham from 105 to 105½. The Continental companies were unchanged. Imperial was done at from 181½ to 182¾, Union at 108 and 109, European fully-paid at 23½ and 24, ditto part-paid at 17 and 17½, and Tuscan at 10¼ and 10$\frac{5}{16}$. Among the undertakings of the remoter world, Bombay changed hands at 5⅝, Buenos Ayres at 11 and 11⅛, Monte Video at 12¼, Primitiva preference at 5$\frac{5}{32}$ and 5$\frac{1}{16}$, ditto debenture at 96½ and 97, River Plate at 13⅛, ditto debenture at 95, and San Paulo at 14⅛ and 14¼.

ELECTRICITY SUPPLY MEMORANDA.

Rejected—Street-Lamp Conversions—Extra Electricity at Fuel Cost!—Council Propose that Ratepayers should Pay for a Disadvantage—A Misinterpretation of Functions by the Burton Electrical Engineer.

ONCE more the existing electricity suppliers of London—company and municipal—breathe freely; and the ratepayers know that, for the time being, they are spared the upheaval of London streets, and are not yet put into the position of compulsory buyers of electricity works and supply far exceeding their own local government bounds. They are all to be congratulated; and more especially as the London and District Electric Supply Bill has fallen in Committee in face of the facilities and blessings bestowed upon it by a Government much harassed by cliques of supporters who all want something in furtherance of municipal and social principles to which they have pledged themselves outside the House. Last Wednesday Sir Luke White's Committee declared the preamble of the Bill not proved. They had given the measure a most patient hearing; and, apart from the refusal of the London County Council to be dictated to by the Board of Trade, with reference to becoming the purchasing authority (as noticed in our editorial columns to-day), they were, if they looked at the evidence placed before them judicially, confronted by overwhelming testimony that the day has passed when a bulk and power scheme for London is required. The small advantage that might be gained on the one hand, would, on the other, without doubt, be entirely swamped by the consequent undue inflation of the capital invested in electricity supply in London. The "small advantage" could only be in the price charged to the power users; and it is extremely problematical whether it would have any really tangible existence. The established electricity suppliers have already been frightened into offering prices for power service that have approximate likeness to those suggested by the successive would-be power and bulk supply companies; but at those prices they do not find, except in an odd district or two, that there is any great demand for electricity for power purposes. It matters not in connection with the argument as to necessity or otherwise for a new scheme that the power and bulk companies' quotations per unit include capital charges, while the charges for power purposes of many of the existing electricity suppliers do not. There are some people, however, who think that an independent bulk and power scheme would be an advantage to London. Sir Hugh Bell, for example. He asserted that he and his friends would be responsible for finding £600,000 for the scheme, under certain conditions; but he did not say whether those conditions included the curbing of powers proposed by the Board of Trade and the terms as to purchase by the County Council. That is a matter, however, about which we need not now trouble, as the £600,000 will not be required—at any rate, for the present. The Bill only proposed one generating-station, with a huge concentration of plant there; and the question of what might happen in the case of fire at the station or stoppage through other causes—in the development of which electricity stations exhibit great fertility—was discussed during the Committee inquiry. But this is also a question that can be shelved with the rejected measure.

The intercommunication scheme of nine existing London Companies met with better fate; but the Committee, true to instructions in this instance, have inserted a clause in the Bill constituting the County Council the purchasing authority. Between now and 1931, however, there is to be no interference with the powers of the local authorities either in the City or the boroughs. With regard to the City, the County Council are to have the same powers of purchase there as elsewhere, unless the Corporation prior to 1931 purchase one or both the undertakings in the City. The County Council are to have power to acquire local authorities' undertakings also; but it will not be in their case a right of purchase, but one of arrangement between the Council and the authorities. The local authorities are given under the Bill, though not contemplated by the promoters, similar powers for linking up, either with companies or local authorities. The whole object of this intercommunication is to afford protection against failure of supply, or to rapidly restore supply on failure. This is one of the best confessions ever made by electricity suppliers as to the proneness of electricity to failure.

The Hastings and St. Leonards Gas Company are to be heartily commended for their action at the recent Local Government Board inquiry into an application by the Corporation for a loan amounting to £1683 for the conversion of 480 incandescent gas-lamps to metallic filament electric lamps. The Company were represented in a manner befitting the occasion, and in a manner that showed respect for the Local Government Board and their representative. An abbreviated report of the proceedings appeared in our columns last week; but there are points that will not suffer from a little further emphasis, showing as they do the loose and reckless principles that govern in certain cases the control of municipal electricity departments. The proposal at Hastings may only be the precursor of similar ones elsewhere. We have had signs of several such schemes; and it is therefore well to be prepared with the answers to the arguments—and what arguments they are, judged by the standard set at Hastings!—that will be advanced in favour of a change from the one system of lighting to the other. It is said that the extra load will be of advantage to the electric light station, that the additional generating expenses will be almost negligible, and that the charges for interest and sinking fund on the loan necessary to the conversion may be ignored. Foolishness and illogicality certainly ran riot in the case for the Corporation.

It was asserted in the same breath by the Town Clerk that there would, by the connection of the 480 lamps, be a gain to the electricity undertaking, and that the undertaking could supply these lamps at the actual cost of generating the electricity. If the Electricity Committee are going to do this—and it is clear they are proposing to supply at below actual cost—where does the gain to the undertaking come in? Concerning the second point, that the additional generating expenses for these extra lamps would be almost negligible, the Town Clerk—acting on his instructions—averred that "the cost of generating additional current was comparatively small. Beyond a certain point, it was simply a question of extra fuel." If we carry this to its logical conclusion, the managers of a municipal electricity undertaking could take on any load they like, and it would only be a question of extra fuel. The point beyond which this can be done being a "certain" one, we should like to hear from the Town Clerk or the Electrical Engineer of Hastings what this point is, and how far the taking on of extra supply at only fuel cost can be carried before a fresh start has to be made, and the whole of the expenses be again calculated. Such information would be highly interesting and instructive, because we have been taught that additions to the peak load are more expensive from the generating point of view than additions in the valleys of the curve. If they are not at Hastings, then Hastings is in an exceptional position, considering that there is no great day demand there. However, we had better wait for the explanation of the Town Clerk or Electrical Engineer before further discussing this particular aspect of the matter. Anyway, it seems to us, upon common-sense reasoning, that there is something unjust to the old patrons in taking on new custom of any kind at only fuel cost. In the name of common decency, some other part of the expense ought to be tacked on. We know that certain members of the Hastings Town Council have been guilty of the folly of making a similar statement as to additional supply at fuel cost; but the Town Clerk!—well, the less said the better. He must follow his instructions. Small wonder the Inspector was not to be convinced on the point, and he flatly told the Town Clerk, with a slight inflection of voice that suggested sympathy, that he

could not see eye to eye with him. It seems that the price to be charged for electricity for these new lamps has been worked out at 2d. a unit "in order," it is admitted, to "compete with gas." But the existing arc lamps are charged out at 3d. Works' costs last year were 2·859d., without the capital charges, which amounted to 3·203d. per unit. If these figures do not show that there will be a loss, and a cumulative loss, to the undertaking from the supply of these additional lamps at peak load at 2d. per unit, then it is time we gave up the commonly accepted belief that two and two make four. It is this kind of unscrupulous finance, or self-deception (call it what one will, it comes to the same thing in the end), that has made the Hastings electricity undertaking the financial failure that it has been since it came under municipal control. We should like to hear the tradesmen on the Council applying the same arguments to their own businesses that they apply to that of electricity. If they did so, their friends, in their own interests, would be justified in taking steps to prevent their utter ruin.

There was another fallacy trotted out at the inquiry; it had reference to the allocation of the capital costs of the conversion of the street lamps. Supposing the lamps proposed to be used are of only 50 Hefner unit power, and so less efficient than the incandescent gas-lamps proposed to be displaced, yet the same annual price is to be paid for these metallic filament lamps as is paid to-day to the Gas Company, and the electricity at 2d. per unit is going to produce a loss for the electricity undertaking (remember Mr. Fawcett, the Inspector, could not see eye to eye with the Town Clerk on this point as to the charge being profitable), then where is the gain coming in for the ratepayers? Notwithstanding the clearly proved fact that the ratepayers are to gain nothing from the change, the argument was seriously made that the standing charges for interest and sinking fund on the loan might be ignored, as the ratepayers would be paying for the purchase of what would ultimately become their own property, and therefore the general district rate should be chargeable. This is a singular argument. What do the ratepayers want with spending £1683 that is to bring them no advantage whatever. It is not an economic thing to pay money for nothing. If the principle advanced in this instance be pursued, private enterprise in the supply of general commodities could be suppressed by the simple plan of municipal borrowing of capital, and charging the district rate with the capital costs, because the ratepayers would merely be paying for the purchase of what would ultimately become their own property. The best way to cure local councillors of all such fallacious notions would be to give enlarged trading powers to the local authority in some socialistic stronghold, so that there could be competition with the local tradesmen. These worthy gentlemen would then soon see things in a different light. "'Tis a mad world, my masters;" and Socialism is ramping. And the doctrine put forward at Hastings has socialistic origin. But let us suggest one plain question to the Hastings councillors: Why should the whole of the ratepayers be penalized in order to enable the Council to play with finance and show fictitious business?

Many local authorities own both the gas and the electricity undertakings; and in their competition with each other, there is a tacit understanding that the competition among the private consumers for business shall be carried on free from detrimental and recriminatory statement. The Corporation of Burton-on-Trent own both the gas and the electricity undertakings; but in their case the Corporation have, without any public reproof, allowed their Electricity Manager (Mr. Pringle) to exceed the functions for which he was engaged by, if we are not mistaken, priming the "Burton Daily Mail" with information that has the obvious intention of depreciating the value of the Corporation gas undertaking by decrying its prime commodity. There is little doubt that Mr. Pringle was responsible for this act, as the article in question opens with these words: "The superiority of electric light over gas—incandescent or any other kind of lighting—it seems has still to be realized by the townspeople of Burton. But that it is superior admits of no doubt, is the contention of Mr. Pringle, the Electricity Works Manager." This sort of thing ought not to be permitted where the rival undertakings are under the one jurisdiction and ownership, but different officials; and Mr. Pringle ought to be very firmly ordered by the Council not to transgress in this way in future. The article in question was also reprinted, and was then circulated from the Electrical Engineer's Department. It would be interesting to know if this was circulated with the knowledge of Mr. Pringle's Committee, and whether they endorse the statements contained in it. The article embraces all the old falsehoods about the metallic filament electric lamp being cheaper than incandescent gas lighting, and as to gas vitiating the atmosphere, and electricity being the healthier and cleaner. It is, of course, also pointed out that the risks of fire with electric lighting is greatly diminished; and, in the result, we are perforce led to the conclusion that Mr. Pringle or the writer of the article has taken a very narrow survey of electrical and gas affairs. The article includes some wonderful figures as to low bills for electricity. Why, of course. People find the fewer the hours they use electricity for lighting, the more economical it becomes. Instead of disseminating statements of this kind, let the Electrical Engineer take steps to get someone (if he has not the courage to do so himself) to accept the challenge of the Managing Director of the Welsbach Company (Mr. L. Fletcher), and make a practical demonstration to test the assertions. If Mr. Pringle has not seen the challenge, he will find it occupying the whole of the front page of the "Burton Evening Gazette" of Nov. 11. Should, too, there be any points regarding the "superiority" of electric lighting (according to the article that appeared in the "Burton Daily Mail") that he would like to discuss with us, it will be a pleasure to oblige him.

THE GAS INDUSTRY IN JAPAN.

To-day we give the first of five articles describing gas-works in Japan, in the interesting and attractive series, "Round the World—and Some Gas-Works," which Mr. Maurice Graham has for some time been contributing to the "Journal." We desire to draw attention to Mr. Graham's account of his journeyings in the "Land of the Rising Sun," for he has been fortunate in being able to collect a large amount of gas matter dealing with the past, present, and future of gas affairs in the great country of the Far East. Particularly in subsequent articles on Osaka, Yokohama, and Tokyo, we think there will be found facts of new import, items of fresh interest, points of importance, and hints of value to gas engineers and contractors at home; and especially to those who have at present but the faintest idea of the possibilities of gas in the East, and to those who desire to extend their commercial interests and industrial pursuits in that direction.

The rise and progress of Japan within the last thirty years are phenomenal. Until the sixteenth century nothing was definitely known of these Japanese islands, except their existence, which had been brought to European knowledge through Marco Polo at the end of the thirteenth century. After the Portuguese explorations, in the year 1542, came the Dutch traders, who were permitted to hold a small factory on an island in the harbour of Nagasaki, which is one of the towns visited and gas-works described by Mr. Graham in the article published in another part of our present issue. For nearly three hundred years, it was only through this Dutch factory at Hirado that Japan held intercourse with the outer world. In 1854, through Commodore Perry and United States warships, the previous policy of isolation was broken up, and Japan entered into treaty relationships with foreign countries. With the gradual permeation of western ideas and habits, the former stern rules of feudalism were relaxed, and their incapacity to defend themselves against western nations was realized. With an orderly thoroughness and a prompt grasping of detail, and an admirable determination to succeed, the Japanese entirely reorganized their whole position, and have attained the high position they now hold as one of the Great Powers; and the Island Empire of the East is allied to that of the West.

The national and political history being such as it is, it is not surprising that it is only within the last half-dozen years that any attention has been directed to gas affairs in Japan. With the exception of Yokohama, where coal gas was introduced in 1874, and the capital Tokyo, which first had gas lighting four years later, we believe that all other gas undertakings have sprung up within the last ten years. It will, therefore, be realized that a great field of future development among a population of about 45,000,000 lies ready to hand. The following summarized statement of some of the statistics obtained by Mr. Graham will show this:—

Town.	Gas Introduced.	Population.	Number of Consumers.	Annual Make of Gas. Cubic Feet.	Annual Increase of Gas Consumption. Per Cent.
Nagasaki	1903	70,000	1,800	24 million	20
Hakata	1905	65,000	2,300	20 ,,	35
Kobe	1898	36,000	6,000	76 ,,	20
Osaka	1905	1,200,000	22,000	360 ,,	100
Nagoya	1907	300,000	2,200	34 ,,	100
Yokohama	1870	360,000	3,260	99 ,,	13
Tokyo	1874	2,700,000	66,250	912 ,,	20

Of course, the above figures relating to the number of consumers and the percentage of increase in the gas consumption are subject to continual variation. For instance, in the large town of Osaka—where the gas affairs are directed by the able mind of Mr. Charles P. Cushman—gas was only introduced to 677 consumers on Sept. 20, 1905; but by the middle of 1908, there were no less than 22,000 consumers, who were even then increasing at the rate of a thousand per month. Similar enormous expansion is exhibited in the case of the Tokyo Gas Company, Limited, which was formed on Oct. 18, 1885, and took over the already established gas undertaking of the city. There were then 11 miles of gas-mains, and the capital of the Company was yen 270,000 (£27,000). Now the mains extend to 588 miles, the capital is yen 17,000,000 (£1,700,000), and a dividend of 15 per cent. is paid. Mention of Tokyo leads at once to the association with it of the name of Dr. Takamatsu, the Managing-Director of the Company and the head of the gas profession in Japan. A former student and graduate of Owens College, Manchester, and for over twenty years Professor at the Tokyo University, practically all Japanese gas engineers of to-day have had the benefit of his schooling, and have passed through his hands. His Company have, for the gas supply of the populous city, three existing works, with a fourth (Omori) in course of construction. Besides these, there are tar distilleries, and a large factory and foundry for the manufacture of gas accessories and fittings.

Though with increasing knowledge, experience, and wealth, the Japanese will certainly develop the necessary ancillary industries to that of gas manufacture, it is equally certain that ample opportunity will arise for the importation of gas articles from abroad.

And it is well that English manufacturers should begin well, and understand the conditions of life and requirements of the people with whom they hope to extend their business connections. In this regard, some valuable hints will be given in the article on Osaka. Mr. C. P. Cushman there says: "No people are more ready and willing to adopt useful and convenient methods than are the Japanese. But it is not sufficient to show that a new method is useful in London or New York or Berlin. It must be useful in Osaka and Tokyo and Kobe, and should not imply a complete change in the customer's manner of living."

What, then, is the average consumer's manner of living? The keynote of it all is simplicity. The wooden houses, put up without any nails, are one-storied, unpainted, and scrupulously clean. There is no furniture, no tables or chairs, and no display of ornaments. Beds are wadded quilts placed on the floor. A charcoal brazier supplies the necessary warmth in winter. Cooking utensils are few and simple; the rice boiler being, perhaps, the most important. The one great domestic institution in all Japanese households is the bath, taken and kept at a temperature of about 110° Fahr., by means of a copper tube filled with red-hot charcoal fixed in the side of the bath. It will be seen, therefore, that there is scope here for the utilization of coal gas and for the application of its appliances. Much has, of course, already been done, but much remains; and if suitability and simplicity are carefully studied, progress and profit will ensue. We commend this and other points in Mr. Graham's entertaining accounts of his travels through Japan to the notice of our readers and manufacturers at home.

THE NEW COALITE POLICY.

THE gas companies of the United Kingdom, save one, have remained obdurate; and the British Coalite Company are now, with regret, mingled with a note of sadness, turning to other bodies for patronage and support. But they cannot refrain from remonstrating with the companies who have so signally abstained from responding to their advances to them. They explain that whereas the gas companies appeared to think that the Coalite industry must operate adversely toward them, nothing was more foreign to the aims or intentions of the Coalite manufacturers. To which explanation we may remark that the gas companies were less concerned with the aims and intentions of the Coalite Company than with results which would ensue from their operations, if they were allowed to pursue them unchecked. Though gas and tar are the bye-products of Coalite manufacture, it is now—somewhat belatedly—admitted that the Coalite Company cannot distribute their gas over an area supplied by a gas undertaking having statutory powers. Have the British Coalite Company no record of their attempt to obtain parliamentary powers for the distribution and supply of their gas for certain purposes over a large area in the east end of London? How do they reconcile this attempt with their protestations of friendly aims and intentions?

We shall not be mis-stating the early attitude of the British Coalite Company towards gas undertakings in saying that they made it clear that if the latter would not adopt their process, or buy their gas, they would enter into competition with them. Out of due regard for their obligations to the public and the interests of shareholders, the managers and directorates of the gas companies heeded not the dictatorial tone of the Coalite Company and refused to disorganise their business and their works at their bidding. As a consequence of this salutary treatment, the Coalite Company have altered their tone towards gas companies, and are now only concerned in placating them with a view to obtaining freer scope for their operations in other directions. Let them not hope that quotations from reports by Professor Glazebrook and Mr. James Swinburne, on the nature of Coalite pitch and Coalite, will satisfy the managers of tar-works and gas-works that those products will not compete with the allied products of the gas industry. There will be competition of the keenest kind pursued by gas companies in self-defence. Even if the Coalite Company could have quoted favourable opinions on their tar and carbonization products from practical authorities instead of from academical physicists and electricians—eminent though they be in their own special but alien spheres—the administrators of gas undertakings would nevertheless wisely have refused to be disarmed until such time as actual experience should teach them that the new Coalite manufactures did not compete with the old gas-works products.

Incidentally the British Coalite Company claim that "a leading organ of the gas industry" has expressed views favourable to certain phases of their enterprise. We do not know what journal it is that is so referred to, but even if there should have been, prior to the expression of its views favourable to the Coalite enterprise, any justification for the description applied to it, the expression of such views would *ipso facto* remove its right to such a description. Fidelity to the interests of the gas industry is incompatible with dallying with the overtures and schemes of the Coalite Company. The temperate attitude of the organ in question is said to be all that the promoters of the Coalite manufactures could desire. Naturally, for it is an attitude of disloyalty to the gas industry.

The British Coalite Company, in the latest and final instalment of their serial advertisement in "The Times," again lay stress on the grounds there are for confidence in the validity of their master patent. They add that they are the owners of many other patents, as the past year has been fraught with fresh experiences. At every stage the construction of a Coalite plant is said to be covered with patents. To all of which we may remark that if an experienced carbonizing engineer were called upon to make a smokeless fuel resembling Coalite, he would intuitively not use the methods and plant for which protection has been claimed in the Coalite patents. If his attention were drawn to them, he would, on practical grounds, dismiss them forthwith from further consideration. The British Coalite Company need not fear that anyone will want seriously to contest the validity of their master patent. The worst fate we can wish the Company is that they should themselves be compelled to work it on an extensive scale. As they boast that ample funds are at their disposal, they need not hesitate to do so.

This boast of ample funds at disposal, and of a future bright with hope, sets us wondering why the Company have deemed it necessary to go to the trouble of advertising the so-called "Progress of Coalite" so extensively and so expensively. It cannot be with a view to pushing the sale of Coalite, for we are assured that already the demand for this mysterious embodiment of all the virtues is far in excess of the supply, and that its inherent merits alone will enable it, in the course of a few years, to displace all the coal and coke at present consumed in household grates. If also the boast of ample funds is *bonâ fide*, the advertising cannot, of course, be with a view to asking the public shortly to provide more capital for the Company's operations, or to induce them to purchase existing shares from the present holders. The prospects of the Company are too good for the general public to be allowed to participate in the immense profits they will earn.

Having failed to cajole gas companies, the British Coalite Company are now endeavouring to persuade municipalities who own gas-works that they can profitably adopt the process which all the privately-owned gas undertakings—save one—have refused. For why? Because Coalite gas has been found to be an ideal and an economical fuel for gas-engines to drive dynamos. Thus the electricity works of municipalities may be run through Coalite. Coalite also is going to assist in providing municipal water supplies, though in what capacity is not clear. It has indeed come as a boon to the municipal trading fraternity; and we wish them joy of it. But the engineers and managers of gas and water works owned by municipalities will be well-advised, for the credit and profit-bearing of their undertakings, to enlighten the members of their gas and water committees and of their town council as to the claims of Coalite. If gas companies administered by boards of business men, themselves keenly interested in the profit-earning capacity of their undertakings, see nothing attractive in the Coalite process, is it likely that gas-works administered by municipal committees will benefit financially by its adoption?

Applying the algebraical rule for the addition of quantities with negative signs to the computation of the profit which electricity supply undertakings now working at a loss may earn by taking to themselves the Coalite process, the sum arrived at appears stupendous. By all means let one concern assimilate the other. Perhaps a bye-product of the Coalite process may be forthcoming shortly which will facilitate the manufacture of metallic filament lamps of yet higher efficiency than those now on the market. In that event, Coalite will be doubly welcomed by the electricity supply undertakings.

WORKMEN'S COMPENSATION STATISTICS.

ONE of the annual reports issued by the Home Office in the shape of a Blue-Book furnishes various statistics of proceedings under the Workmen's Compensation Acts and the Employers' Liability Act of 1880. The report for 1907, like its predecessors, gives all the information that is available on the subject; but on the present occasion a disturbing factor has been introduced by the Compensation Act of 1906, which was in force during the last half of 1907. In comparing the figures in the returns—they are, it may be said, given separately—under the 1906 Act with those under the earlier Acts (that is, of 1897 and 1900), it has to be borne in mind that the former will represent less than a full six months' working of the Act. All the cases arising during the period of the operation of the new Act could not have been settled before the end of the year; while, on the other hand, the figures of proceedings under the earlier Acts would include, besides the cases arising in the first six months of the year, those which stood over from 1906.

In future years it will be possible to give much fuller returns as to the working of the law relating to workmen's compensation, as the Secretary of State is empowered by section 12 of the 1906 Act to require employers in any industry specified by him to furnish annually information as to the number of cases of compensation, amounts paid, &c. In most of the chief industries, employers have already been requested to do this; and the first returns will be made in respect to 1908. The earlier Acts, of course, contained no provision for the making of returns to show the working of the systems of compensation which they established; and the sources from which official statistics could be obtained were therefore limited to those cases in regard to which some sort of proceedings ensued—the great majority of cases (those in which a settlement was arrived at by agreement) being perforce left out of consideration. The present report furnishes

particulars with reference to the following matters: Cases coming for arbitration before the County (in Scotland, the Sheriff) Courts; those in which memoranda recording agreements or awards by committees or private arbitrators under the Workmen's Compensation Acts are registered in the County or Sheriff Courts; those taken to the Appeal Courts; the use made of the services of Medical Referees; and "contracting-out" schemes certified by the Chief Registrar of Friendly Societies. The report is divided into three portions, covering respectively England and Wales, Scotland, and Ireland.

Beginning with England and Wales, it is found that in 1907 the number of cases actually dealt with under the Workmen's Compensation Acts by County Court Judges and County Court Arbitrators was 2257; and of these 1997 were decided by Judges, and 44 by Special Arbitrators, while 216 cases were settled by acceptance of money paid into Court. In addition to the cases adjudicated upon, there were 1073 which were withdrawn, settled out of Court, or otherwise disposed of in such a way as not to enable the officials of the Court to definitely state the results. This makes the total number of cases taken into Court 3330 (of which 835 were under the 1906 Act), as against 2532 in 1906, and 2469 in 1905. In three instances compensation was claimed under the 1906 Act for incapacity due to industrial disease; all the others being cases of accident. With regard to the decisions come to, it may be remarked that of the claims settled within the cognizance of the Courts, 1375 cases resulted in favour of the applicant, and 271 in favour of the respondent. As to the former, however, there were eight cases under the earlier Acts in which compensation of 1d. per week was awarded, and two instances of 1d. a week and one of 1d. a month under the 1906 Act. The proportion of successful claims was thus 84 per cent., as compared with 83 per cent. in 1906, and 82 per cent. in 1905 and 1904. The number of cases in which compensation was awarded on account of the death of workmen leaving dependants was 537; the corresponding figure for 1906 having been 553, and that for 1899 (the first complete year during which the first Compensation Act was in operation) 219. The total sum awarded last year in the 537 cases of death in which the deceased left dependants, was £95,992, of which £28,435 was for the 163 cases under the 1906 Act. The average amount paid was £180 12s. 8d. under the earlier Acts, and £174 9s. under the 1906 Act. These figures compare with an average of £190 13s. 11d. for the previous year. The figures here given include both cases in which the deceased left persons wholly dependent (and in which the compensation may not be less than £150 and may be as much as £300) and those in which persons only partially dependent were left (and in which the compensation is to be proportionate to the injury to such partial dependants). No account, however, is taken of the two instances in which no dependants were left. Of the 537 cases last year, there were 145 in which less than £150 was awarded; the total amount being £9949, or an average of £68 12s. 4d.

With regard to the cases of injury, as usual the assignment of a weekly sum was the most general method of compensation adopted; there having been 154 cases in which the compensation was returned as consisting of a lump sum, and 682 in which a weekly payment was fixed. In 37 of the cases in which a lump sum was paid, the claimants accepted the amounts paid into Court; while in most of the remaining cases, a lump sum was apparently awarded by consent of the parties. The average amount was £31 7s. 2d. The statistics in regard to the weekly payments are necessarily less complete; for while the weekly rate can be given, the length of time over which the payments extend cannot generally be ascertained. No computation can therefore be made of the total capital value of these grants. In the case of mutually agreed schemes certified in England and Wales by the Chief Registrar of Friendly Societies, the average duration of cases of incapacity lasting more than a fortnight (excluding those which continued for a period of over six months) was 5·2 weeks. It is, however, pointed out in the report that the average duration of contested cases would doubtless be higher. In cases of injury in which weekly sums were assigned during 1907, the average amount per week in instances of total incapacity was 11s. 11d. under the earlier Acts, and 12s. 3d. under the 1906 Act; the figures relating to partial incapacity being 9s. 5d. and 9s. 8d. Under the Acts of 1897 and 1900, there were seven classes of employment included—railway, factory, mine, quarry, engineering work, building (part only), and agriculture. Of the total number of cases under these Acts taken into Court during 1907, nearly one-half came under the heading of "factories and workshops"—namely, 1197, out of 2495. Now that employment of almost every description is included, of course, a fuller classification has been rendered necessary; and this has been based as far as practicable on the grouping of occupations adopted in the census returns. The list, and the number of cases under the 1906 Act taken into Court during the six months to Dec. 31, are as follows: Professional employments, 4; commercial occupations, 1; shop assistants, 14; domestic servants, 40; seamen, 28; fishermen, 2; agriculture, 45; building, 96; factories and workshops, 224; docks, wharves, and quays, 63; mines, 136; quarries, 16; constructional work (excluding building), 38; railways, 64; inland transport by road, 53; inland transport by water, 6; and miscellaneous, 5.

The next table deals with instances in which memoranda were registered in County Courts, having reference to cases settled by agreement or private arbitration. There were, it appears from these statistics, 9074 cases settled by agreement, 273 by committees of employers and employed, and 2 by an arbitrator. These figures are larger than those in the previous report, owing to the provisions of the new Act. In these agreed cases, the average compensation awarded to dependants in connection with fatal accidents was £143 19s. 8d. under the earlier Acts, and £173 6s. 5d. under the 1906 Act; the average weekly payment in cases of incapacity being 13s. 3d. and 12s. 8d. respectively. A lump sum for incapacity was agreed upon in 3385 cases, as against 3685 in which a weekly amount was fixed. The average lump sum under the earlier Acts was £49 7s. 5d.; the highest average under the different classes of employment being mines £84 6s. 2d., and the lowest railways £25 5s. 7d. Under the 1906 Act, the average lump sum is only £8 7s. 4d.; but this the report remarks is due no doubt to the fact that only the less serious cases arising under the new Act would have been commuted before the end of the year. However, regarding the cases that were settled by payment of a lump sum before Dec. 31, mines are still at the top, with an average of £25 16s. 3d., and railways at the bottom with £2 15s. 2d.; the average for shop assistants being £4 6s. 10d., and for domestic servants £6 12s. 6d.

The Employers' Liability Act is dealt with in another portion of the report, upon as nearly as possible the same lines as the Compensation Acts; but here the compilation of the statistics is simplified, owing to the fact that all cases except those removed to the High Court are decided by the County Court (there are no arbitrators), and also because the damages awarded can always be stated as a lump sum. The falling off in the number of actions brought under the Act continued last year; the figure being 393, as against 476 in 1906, and 688 in 1897—the year of the passing of the first Compensation Act. Of the 393 cases last year, 95 ended in judgment for the plaintiff, 55 in favour of the defendant, and no less than 243 were "otherwise disposed of." The total amount of damages awarded was £7254. A table shows the average amount of damages in case of death recovered under the Employers' Liability Act was £162 15s. 1d., against £178 15s. 2d. under the Compensation Acts; the average amount of solicitor's costs being £26 15s. 7d. and £11 8s. 1d. respectively.

Precisely as happened in 1906, the cases under the Compensation Acts in England which were carried to the Court of Appeal were just over 2 per cent. of those that came before the County Courts. The number in 1907 was 70; 37 being appeals by workmen, and 33 by employers. Of the former 15, and of the latter 11, were successful; while 15 appeals were abandoned, withdrawn, or settled out of Court before the hearing. Eight of the appeals were under the new 1906 Act. There were three appeals to the House of Lords (as against two in 1906). All were by workmen; but not one was successful. The points in the Acts on which these three appeals to the House of Lords are stated to have turned are as follows: Meaning of the words "serious and wilful misconduct;" application for review after termination of weekly payments; and admission of liability on the part of employer. The last-named case "JOURNAL" readers will be familiar with, as it was that of *Cleverley and Others v. Gaslight and Coke Company*. Of the 70 cases that were carried to the Court of Appeal, the meaning of the words "arising out of, and in the course of, the employment," were responsible for no less than 15. One of the appeals under the Act of 1906 was for the purpose of getting a definition of the term "workman."

With regard to Scotland, the report states that during 1907 the number of cases taken into Court under the Compensation Acts was 417; and under the Employers' Liability Act, 190. The average amount of compensation paid in case of death where dependants were left was £151 10s. 5d. in cases decided in the Sheriffs' Courts under the Workmen's Compensation Acts, and £188 1s. 11d. where memoranda were registered. In cases of incapacity, the lump sum figures were respectively £16 9s. and £7 2s. 1d., and the weekly payments 16s. 9d. and 12s. 9d. In Ireland last year there were 312 cases taken under the Workmen's Compensation Acts, and 21 under the Employers' Liability Act. The average amount of compensation in cases of death where dependants were left was £121 17s. 9d. when decided in the County Courts under the Workmen's Compensation Acts, and £119 16s. 1d. where memoranda were registered. In connection with claims for accidents causing incapacity, the lump sum figures were respectively £13 7s. 3d. and £34 14s. 10d., and the weekly payments were 7s. 4d. and 11s. 2d.

Coke and Gas Companies in Germany.—According to a special telegram sent from Berlin to the "Financial News," the Coke and Chemical Company of Upper Silesia announce that negotiations have been concluded with the American Coal Products Company with a view of floating in the United States a new company for the building of coke-ovens. It is stated that, with the assistance of a New York Company, whose capital amounts to $2,000,000, there has just been formed the German-American Coke and Gas Company, with a capital of $500,000.

Water-Pipes of Reinforced Concrete.—In connection with the new water-works at Burncrooks, Clydebank, it has been decided by the Clydebank and District Water Trustees, after consideration of a report made upon the system by a deputation sent to inspect the piping, to adopt reinforced concrete pipes of the Bonna type, such as have been employed in Norwich and Paris. The length of piping required is more than nine miles; and it is stated that the price of concrete pipes would be £5500 less than that of cast-iron pipes, while they were more suitable for the purpose.

GERMAN GAS AND ELECTRICITY TAX.

THE German Government Bills for raising additional revenue to the extent of £25,000,000 per annum were introduced in the Reichstag last Thursday. These Bills include the projected tax on gas and electricity, of which details were published in the "JOURNAL" for the 10th inst. (p. 399).

Prince Bülow, the Chancellor of the Empire, made the introductory statement on the financial position and the proposed fresh sources of revenue in general; but from the report of his speech in "The Times" of Friday, he does not appear to have referred specifically to the gas and electricity tax. Herr Sydow, the Imperial Foreign Secretary, who followed with a speech of four hours' duration, had something to say about this tax; but "The Times" report only summarizes his words on the tax as applied to electricity. He suggested that the Empire might rightly expect to get back thereby some of the money which it had spent so generously upon the scientific investigations of which the results were now being applied. "The new tax would not check scientific development or diminish consumption; and it was rendered the more tolerable by reason of the great reduction in the cost of production. If the taxation was thought to be reactionary, he would point out that the Empire would be drawing money from a source which had long supplied revenue to the towns of Germany. He would not deny that the new tax was a tax upon production; but the Empire could not live upon theory alone. Moreover, Germany was so far in advance of all other countries in regard to the application of electricity that she could easily bear the tax." The debate on the financial proposals stood adjourned to Friday, when the leaders respectively of the Conservative, the Free Conservative, and the Socialist parties addressed the House in regard to them; but no reference by either speaker to the gas and electricity tax is reported. In all, ten days have been allotted to the discussion on the first reading of the Finance Bills.

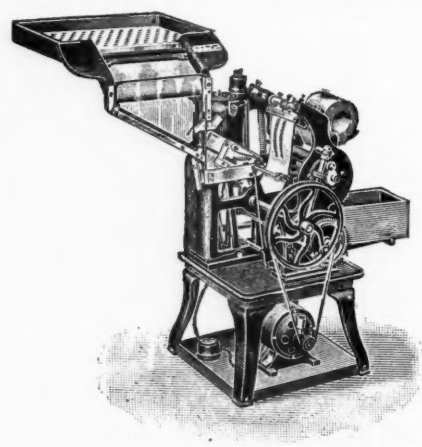
Meantime protests are being made throughout Germany by all the parties who will be prejudicially affected by the imposition of this tax. For instance, the Association of Mantle Manufacturers are actively participating in the agitation, especially in regard to the tax on mantles, which it appears is to be collected through the affixing of an official duty label or banderole upon each box containing a mantle. The Association have issued through the "Journal für Gasbeleuchtung" a request for assistance from all who will be affected by the proposed tax on mantles in preparing a convincing statement of the effects which it will have on the industry. In particular, they ask members of the trade to investigate the incidence of the proposed law on their own businesses, and to report the results of such calculations to the Committee who are organizing the agitation. They also ask for cuttings bearing on the question from daily newspapers, and suggest that meetings of protest should be organized by all the trade associations, and that reports of such meetings and resolutions adopted at them should be forwarded to them. They thus hope to obtain material for a vigorous and effective protest. Herr Jacques Goldberg, the Editor of the "Metallindustrielle Rundschau," of Berlin, is acting as Secretary to the Committee.

Herr Goldberg reports that, at a meeting held in Berlin on the 9th inst., of about 800 master fitters and plumbers carrying on business in the city and the neighbourhood, a strong resolution of protest against the projected tax was passed, and a copy forwarded to the Government. It recited that both electricity and gas were used in small industries and crafts, not only for lighting, but also as sources of power and means of manufacture. If gas and electricity were made dearer by taxation, the ability of the smaller craftsmen to compete with the large factories endowed with much capital would be greatly weakened. The resolution proceeded to point out that the tax on mantles would be disastrous to all except the large factories in which much-advertised brands of mantles were made. These factories fixed the retail selling price of their mantles, and the retailers obtained only very small profits from the sale of such brands. A great number of small fitters and craftsmen would be forced to give up the selling and fitting of mantles, in order to escape destructive competition. The increase in the cost of mantles would also lead to a reduction of the consumption. The trades represented by the Association had hitherto found the sale of mantles a fruitful source of income; and the projected taxation would jeopardize the means of livelihood of a large number of their members.

MECHANICAL COUNTING & PACKING OF COINS.

IT is common to describe this as a labour-saving age, and an age when inventors are constantly alert in the attempt to discover means for mechanically securing economy of time and expenditure. But, nevertheless, it cannot be said that, comparing the past with the present, employment taken as a whole is on a reduced scale. Fresh industrial developments are ever being made, new public conveniences are constantly being introduced, invention is always busy; and all this and more that cannot be minutely catalogued is being done to give employment. Where mechanical invention enables one to dispense with some amount of manual labour, there is the labour that is required to produce the contrivances, from raw material to finished article. There is a constant compensating shifting of labour; and, speaking generally, the new work is of a character that is on the upgrade. Let us take only one illustration of an extension of employment in the gas industry. Within the recollection of most of us engaged in the industry today, is the time when there were no slot meters. The slot meter has come, and has been an abundant success. It has given employment to thousands upon thousands of people from the making of the meters and fittings to their installation, subsequent maintenance, and to the meter reading, collecting, and clerical work, to say nothing of the great expansion of labour in the extension of manufacturing plant, in the obtaining of the raw materials, and in the making of the gas that the prepayment consumers demand. The system is on the increase, and so consequently is the work associated with it.

In this work, where the system has been largely adopted, the counting and packing of the coppers collected add to the expenses of the system; and there have been several ingenious endeavours of a more or less successful character to produce economy in this connection. The time of the collectors can be more usefully and thus profitably employed than in the tedious task of counting by ordinary means, with the possibility of error creeping in by even momentary inattention. The newest machine that has been introduced to our notice for expeditiously performing the work of counting and packing is one of which the British and Colonial rights have been secured by Alfred Herbert, Limited, of Coventry, and Nos. 24-26, Holborn, E.C. It is a machine of American origin; but plant is being put down by the firm for turning it out in large numbers in this country. The machine is shown in the illustration. It will be observed that there is, at a convenient height for the attendant, a top plate, on which the coins—in this instance, pennies—are placed, and are fed by hand into the glass-faced race which is angled to a degree to ensure the coins falling down in rotation into a lower channel, whence there is delivery into a receiver, which assembles the coins side by side into blocks of 60 (5s.)—the quantity being registered on



an indicator dial at the side, and within sight of the attendant. Until there is the number of coins assembled in the receiver for which the machine is set, it will not perform its final functions of wrapping the coins in paper (mechanically detached from the roll shown in the illustration), turning in the ends to make a solid cartridge-like roll, and ejecting the completed packet into a box at the rear of the machine. When once the coins are packed in this way, it is a matter of impossibility to remove one or more without destroying the wrapper to a sufficient extent to cause detection. The motive power is electricity; and all that has to be done is to connect up the little motor by flexible wire to a wall plug of a lighting system, and energy sufficient is thus obtained, at, we are informed, a cost of about 1d. a day.

There are a few additional points in favour of the machine (the working of which has been demonstrated to us) that are worth noticing. The feeding of the machine by hand enables the sorting out of bad coins and discs; and any trustworthy person can do such simple work as this—the machine doing the rest. The speed is the remarkable one of 400 coins a minute, providing there be no stoppage. Should there be a stoppage, it can soon be rectified, as all parts are readily accessible. Furthermore, in the event of a stoppage, an automatic clutch comes into action, and throws the operating parts out of gear, so that no damage can possibly occur by any overstraining of the operating parts. The accuracy of the machine is another point in favour. A still further one is its adaptability for coins of any value or size; so that the range of utility of the machine does not begin and end with pennies. It will thus be seen that, in addition to counting the pence collections from slot meters, the machine can be used for counting and packing the wages of employees in large industrial establishments. From the demonstration made of its efficiency, there can be no question as to the expedition of the machine, and therefore its power of economizing time. It is calculated that a machine that can be fairly well employed will not be long in paying for itself. Including capital expenditure, interest, maintenance, and other expenses, the cost is put at 10d.

per day. From this, readers will be able to judge whether they have a sufficiency of work in coin counting and packing to render the adoption of such a machine a good investment. It is a cleverly-designed piece of mechanism; and there is no doubt it will command many patrons in its divers fields of usefulness.

OIL RESIDUES AND TAR FOR GAS MAKING.

The Rincker and Wolter System.

In the "JOURNAL" for Dec. 13, 1904, we gave an abstract of the specification of a patent taken out in England by Heeren Rincker and Wolter, of Amsterdam, for a process of making gas suitable for lighting, heating, and the production of power from residues heavily charged with hydrocarbons. The process was described and the apparatus illustrated; but until quite recently we were unaware it was being tried on a practical scale. We learn, however, that a Syndicate has been formed (with offices in Amsterdam) to exploit the process, and that trial gas-works have been erected in another part of the city where it may be seen in operation, and where persons interested may, in an adjacent laboratory, test for themselves the resulting gas. With this introductory explanation, the proposal of the inventors may be given in (to a large extent) their own words.

In proposing their system, the patentees were quite conscious of the fact that they were adding another to the several methods of making gas at present in use, and that it might be thought that their attempt to establish it would be futile. At the same time, while admitting that the existing systems possessed certain advantages from the point of view of the raw material employed or the residual products obtained, they recognized certain disadvantages attending their working. They thought, therefore, that there was room for a system which embodied a new idea with respect to the raw material and its treatment—a system which would enable the operator to determine, within certain limits, what were to be his results, and which did not produce any residuals whatever, but, on the contrary, would utilize those that resulted from other methods. They ventured to believe that these qualities were possessed by their system.

The materials employed by the patentees are petroleum residues, coal tar, and water-gas tar. It will be understood, from the word "residues," that the system is not affected by inequalities in the nature or composition of the raw material. Consequently, those who adopt it are not so restricted as in other cases as to what they are to use. Any material which contains the heavy hydrocarbons (there is no objection to the presence of a certain quantity of free carbon or water) may be utilized. Of course, the quantity and quality of the resulting gas depend upon the nature of the material chosen; but it does not follow that an inferior product will be obtained from an inferior material. Another point of importance is that the whole of the raw material is converted into gas; no refuse whatever being left.

These are the principal features of the system, which is carried out in the following way: The residue selected passes down through a column of coal or coke, raised to a suitable temperature. The high heat causes decomposition of the residue; and on the resulting products passing into a still hotter zone, they are finally converted into gaseous heavy hydrocarbons. The carbon thrown off during the process of decomposition settles on the coke, and is consumed when the column is heated up. The raising of the coke to the right temperature takes place alternately with the gasification of the residue by means of the heat obtained. There is consequently a "blow" and a period of gasification, the respective durations of which are regulated by the nature of the material employed and of the product required, the purification of which is effected in separate apparatus.

Various materials have been tried by the patentees, including the residues of Texas, Java, and Borneo petroleum, a mixture of water gas with coal tar, water gas alone, and mixtures of tar with petroleum residue. The gas obtained from the last-named material had the following composition :—

	Per Cent.
Carbonic acid	1·0
Heavy hydrocarbons	8·8
Oxygen	0·3
Carbonic oxide	3·3
Methane	17·9
Hydrogen	59·2
Nitrogen	9·5
	100·0

Its calorific value (at 60° Fahr. and 30 in. atmospheric pressure) was 4918; but it may be raised to 6000 calories or brought down to less than 3000. The quantity and composition of the gas vary. With a calorific value of 5000, 100 kilos. (220 lbs.) of residue yielded 103 cubic metres (3637 cubic feet) of gas. Up to the present, 6 per cent. has been the highest quantity of carbonic oxide found in the gas; and the proportion of sulphur in the crude gas has never exceeded 45 grammes per cubic metre, or 2000 grains per 100 cubic feet. A mixture of one-third of coal tar with similar proportions of water-gas tar and Java residue has, it is stated, yielded 64·5 cubic metres, or 2278 cubic feet, of gas, having a heating value of 4400 calories, per 100 kilos.

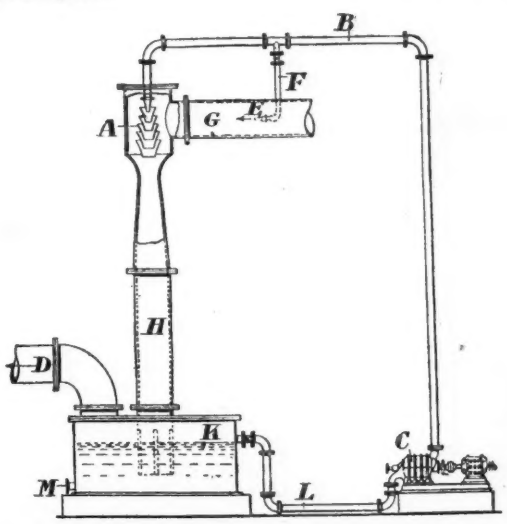
The patentees point out that with the same installation of plant gas can be produced varying in quality from "blue" water gas to very rich coal gas, according to the material selected and the mode of operation. While possessing all the good qualities of coal and water gas, their coal-oil gas differs from them in one important respect—viz., its extremely low proportion of carbonic oxide; and it has a pungent odour which, not being obtained by artificial means, is a permanent quality. The operation of the plant is extremely simple—more so, indeed, than in the case of that used in the production of water gas, as no steam is required; and the gas is made rapidly. The working staff can therefore be reduced by the boiler attendant being dispensed with. In gas-works already possessing carburetted water-gas plant, the tar made can, by the system described, be converted into gas.

The advantages claimed for the Rincker and Wolter system may be briefly summed up as follows: Small area required for the plant in proportion to the output; possibility of employing raw material of varied composition, utilizing the residuals of other systems of gas making, and producing gas of qualities ranging from "blue" water gas to rich coal gas; and equal facility of distribution over large areas by means of pipes as that possessed by ordinary coal gas. Other features of the system which may be mentioned are that the operation of the plant does not call for technical knowledge, and only a small staff is required; the gas is produced in a few hours, and can be consumed by the aid of burners and other appliances now in use; and, owing to the low cost of installation and working, it can be supplied at a comparatively cheap rate.

SEPARATING TAR FROM GAS.

A French patent has been taken out by Dr. C. Otto and Co., for apparatus for separating tar from gas. The specification, which has lately been published, was reprinted in the "Journal de l'Eclairage au Gaz" for the 5th inst., from which the following particulars have been obtained.

The object of the invention, as stated above, is to remove the tar from the hot gases coming from the retorts, by the aid of tar, purifying liquor containing it, or both; and the process employed is to run the gases through an injector fed with these substances. The injector has a twofold object. It serves to rid the gases of the tar they contain, and to set them in motion by its aspirating power. The introduction of tar or tarry liquor into the retort gases has this result—that the gases mix intimately with the injected material, as they are highly compressed in the process. Experiment has shown that in a cubic metre of gas coming from a retort at 115° C. (240° Fahr.) there are 45·01 grammes of tar, and that after it leaves the injector there are only 2·48 grammes. These figures are equivalent to about 20,000 grains and 1084 grains respectively per 1000 cubic feet. At a higher temperature, some inconvenience may be experienced from tarry particles, carried forward by the hot gases, obstructing the injector. This may be prevented by sending a stream of fluid tar into the gas before it enters the apparatus; and for this purpose it is considered preferable to utilize under pressure the same pipe that feeds the injector.



In the practical application of the process, apparatus similar to that shown in the accompanying illustration is used.

A is the injector, to which tar is conveyed by the pipe B (under pressure) by means of a centrifugal pump C. To the pipe B there is connected a suction-pipe F, which enters the gas-pipe G in such a way that the nozzles E project atomized fluid tar as required against the orifices of the injector, to remove, when necessary, the deposits and obstructions that may have formed. The tar which sucks the gas through the pipe G, and throws it through the pipe H, into the box K, collects in this box, and returns to the centrifugal pump by the pipe L. The tar removed from the gas may be drawn off at M; and the gas is conveyed away by the pipe D.

HANDS AND CO.'S LIGHTING SPECIALITIES.

In the show-rooms of Messrs. G. Hands and Co., some new and interesting features are found in the goods on view. In regard to them, we are asked to, above all, state that they are *in toto* British made. No one will grumble at the firm on this score; and so we will, without discussing the point, at once turn to three or four special lines without attempting to make a general survey of the numerous types of lighting fittings shown.

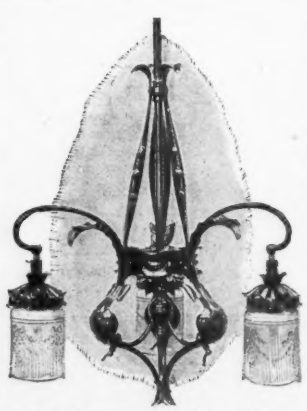
In the first place, the inverted burner of the high-power type—that is to say, of a type in excess of the lighting ability of the ordinary domestic inverted burners, but not reaching the illuminating powers of the misnamed "arc" variety of gas-lamp—has been found of great value for exterior lighting purposes, as also for illuminating large interiors. The demand has led makers to produce inverted burners specially of a type suitable to the requirement. Messrs. Hands and Co. have now developed a burner of the kind in which they have endeavoured to fashion, and seem to have succeeded in producing, a perfectly cool gas and air adjustment above the burner. After one of these burners has been alight for some considerable time, the hand can be placed upon the air and gas regulators with impunity. They are, in fact, at any time during use only just warm. Now this clearly shows two things—that if the top of the bunsen tube is merely warm, and not so hot that it is impossible to regulate the burner during use, the metal work above cannot be subject to deteriorating heat; and that the heated products of combustion must be completely diverted from the air-inlets of the burner. This is achieved by inserting a block of asbestos in the head of the burner, which breaks contact between the top and bottom part of the bunsen tube. This block of asbestos rests between two curved wings, which direct the products of combustion outwards and away from the upper part of the bunsen tube. Combined with the advantage of the cool gas and air adjustment, therefore, the makers are in a position to say that there will not be any unsightly discoloration of the metal work above the burners either by heat or by the action of the products. Too much emphasis cannot be laid upon the importance of affording protection to the fittings, as nothing is more disagreeable than to see, in a room that is otherwise well appointed, a pendant or bracket discoloured or with an incrustation upon it. The makers say they are quite prepared to give a guarantee that neither the one nor the other will happen with this burner. It should be mentioned that the gas adjustment is on the lever principle; and it cannot be over-turned. It is possible by it to turn the gas on full or turn it right off; but once it has been set to the quantity of gas required for giving the highest efficiency, the regulator can, by a half-turn of a screw, be fixed. In this device, the needle of the regulator is always in a permanent position; and a socket moves round it, so that the point of the needle is always central, and consequently the jet is of perfect form. Another feature is that the flame is a full one. Flame volume—a flame sufficient to well fill a mantle—is, as one authority has told us, important in getting high efficiency from a burner; and with this burner there is a good volume of flame. Tested by a gas engineer, at an angle of 90° from the horizontal, it gave 81 candles for 3·3 cubic feet of gas, which represents an efficiency of about 24 candles per cubic foot.

Hands' High-Power Inverted Burner.

The next speciality to be noticed is an inverted outdoor lamp, giving 135 candles per burner, and made with clusters of two, three, or four burners. The casings of the lamps are of enamelled steel. The whole of the parts are made in this country, and are fitted together in the firm's factory in Birmingham. The lamp is of the regenerative type, and is not by any means inartistic in appearance. Instead of a separate flue for each burner, there is only one central flue; the patent mantle holder with which the lamp is fitted assisting so largely in the regenerative work that the separate inner chimneys can be completely dispensed with. The firm, in fact, are not favourable to inner chimneys; for, in their experience (whatever may be the experience of others), they find that the inner chimneys have a tendency to break, causing disaster to the mantle, and occasionally even to the outer globe. With regard to the burner, the arrangements for regulating the gas and air are neat, and the means for operating are brought outside the casing, so that regulation can be instantly and readily effected. Concerning the regenerative feature of the lamp, the central chimney forms, with the outer casing, an annular chamber in the head of the lamp. The cold air passes in just above the dome of the reflector, is heated by the heat abstracted from the products of combustion by the central chimney, and is then drawn down into the lamp round the metal mantle-holder, which, by the way, is slotted to admit of removal and replacement in the easiest possible manner. The lamp is constructed so as to be absolutely storm-proof; and it has been experimented upon, during its construction in Birmingham, in all sorts of gales, but without any detrimental effect whatever. It is also fitted with a bye-pass for lighting purposes. Of course, the average illuminating power per burner being 135 candles, the duplex burner lamp will give 270 candles; the triple-burner one, 405 candles; and the four-burner one, 540 candles.

Hands' Three-Light Inverted Outdoor Lamp.

There is no doubt that gas-supply undertakings must nowadays give the best possible attention to the question of street lighting, as any excuse that can be framed now where there is a municipal electricity supply will be forthcoming for a transfer of favour to metallic filament lamps. In the "L'fin" street lamps of Messrs. Hands and Co., we have one in which is incorporated an anti-vibrating device for clusters of inverted burners. The lantern itself is a substantial and well-finished construction. Special consideration has been given to the proportioning of the air inlet to the lantern and the exhaust outlet for the products of combustion. The reflectors are of Staffordshire enamelled stoneware, and strongly supported in the lantern roof. Cleaning of lanterns is necessary in all sorts of weather; and the double doors with which the lantern is provided enable cleaning to be carried out at any time on the leeward side. Regarding the anti-vibrating cluster burner with which the lantern is fitted, the bunsen tube is provided with an asbestos washer, which allows the burner-head supporting the mantles to move quite freely in any direction without shock or jar to the mantles. The air supply is taken in at a point below the flame; and the gas and air mixture is conducted by one central bunsen tube to the mixing-chamber, which is highly heated by the escaping products of combustion, and by radiated heat from the closely grouped mantles. Consequently, a good mixture and a high-temperature flame are obtained. An adjustable gas-regulator and air-slide are provided for governing the mixture to the right proportions. The burner parts are all interchangeable, and so maintenance is reduced as low as possible. The lantern (which is a 15-inch one) is impervious to boisterous conduct on the part of the elements. Bijou sized mantles are used.



The "Bromley" Pendant of the "Modern Art" Series.

A few words, in conclusion, about the firm's fittings. There is on view an excellent diversity of designs, which may be similarly characterized. A special feature is being made by Messrs. Hands of oxidized copper, which is a favourite style since inverted burners came into vogue, as oxidized copper does not suffer the deterioration to which brass has been subjected where unprotected. But, of course, brass fittings are the most suitable for some rooms and forms of decoration; and herein we have one of the reasons for the design of the burner first described in this article, which burner, it has been explained, gives protection to the metal work. However, in the range of fittings that are shown, it is demonstrated that cheapness need not be divorced from artistic merit. On the other hand, if particularly handsome fittings are required, they can be had at what appeal as reasonable prices. Modern art fittings, illustrative of fine hand-beaten metal work, give especial gratification.

ROUND THE WORLD—AND SOME GAS-WORKS.

By Maurice Graham.

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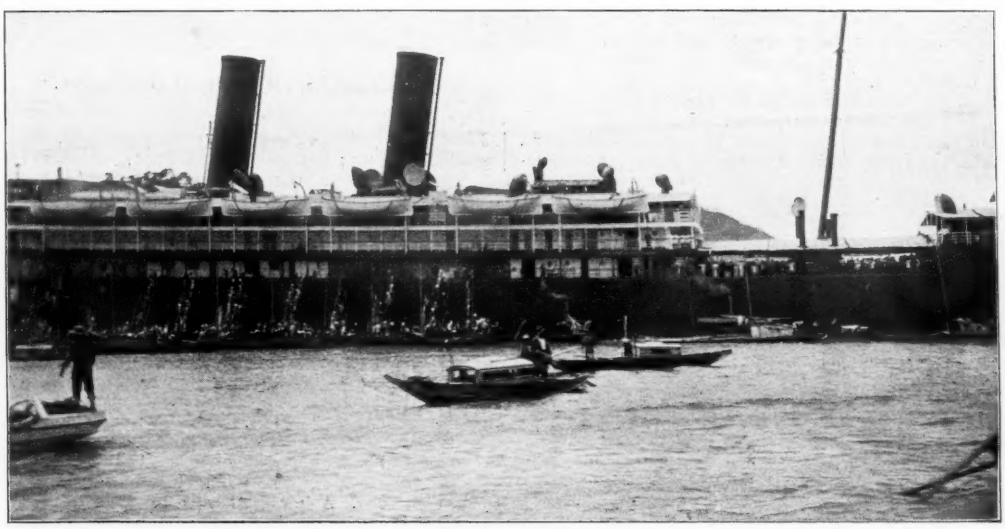
XV.—JAPAN: NAGASAKI, HAKATA, KOBE, AND KYOTO.

The first glimpse of Japan came up to all expectations, and was obtained upon entering the Harbour of Nagasaki, which is a natural harbour similar in formation to that of Hong-Kong. There is a series of small islands at the entrance, which originally belonged to the English and Dutch. All the country surrounding the harbour is of a hilly character, and is cultivated, terrace upon terrace, in a similar manner to that seen in Italy.

Wonderful Coaling.

Nagasaki is a great coaling port; and it is here that one sees the quickest coaling in the world done by hand labour. The writer, with his twenty-five years' experience of handling material by elevators and conveyors and other classes of machinery, was astounded to see the speed and system with which a large steamer can be coaled. The coal comes by rail from Takasaka, Shimnoseki, Taskishima, and other districts; and lighters carry it alongside the steamship to be coaled. Platforms, one above the other, are fixed at a distance of 3 feet. In the case of the s.s. *Siberia*, there would be about six of these platforms—making a distance of about 20 feet from lighter to the coal-shoot in the vessel. Upon these platforms, men and women stand in a double row facing one another. The arrangement really becomes a "human ladder," or better still, a "human elevator." (See Photograph No. 134.)

Baskets holding two shovelfuls of coal—from 15 lbs. to 18 lbs. in weight—are filled by a gang of men in the lighter, and are



Photograph No. 134.—Coaling the s.s. *Siberia* at Nagasaki. Notice the rows of "human" ladders or elevators.

immediately picked up by a pair of brown hands, which pass the basket with all speed to the next and next, and so on until it reaches the bottom of the human ladder, when it ascends at a speed of 20 feet per 5 seconds, or at the rate of 240 feet per minute. This speed was checked over a dozen times, and was the same in nine instances—the remaining three being 6 seconds for the 20 feet rise. To be a spectator of this method of handling coal is to be astonished at the rate the baskets regularly travel up this human column. The basket never loses its inclined plane—everyone giving it a gentle push upwards, all in the same direction. There are usually eight or nine lighters on each side of the vessel; so there will be a corresponding number of "human elevators." Like so many bees, the little Japanese bodies swing to and fro in regular time, and never make a miss. Thus the baskets rise in rapid succession until the girl at the top empties the basket into the shoot, and with the same movement of her hands throws the empty basket down into the lighter, where there are hands ready to catch it and pass it along to be refilled.

There is absolute freedom of labour in Japan; the women having the privilege of doing as much as—or more even than—the men. Young and old of both sexes (and, in many instances, the young mother with her baby strapped to her back) go to make this living mass of workers. An ordinary day's work for a fair-sized gang of (say) 500 workers is 1800 to 2000 tons; so that the speed at which these little Japanese women have to work through the terrific heat of summer and cold of winter can well be imagined. The writer was informed that an "Empress" liner had been coaled with 1200 tons in 3¼ hours—equalling 372 tons per hour.

The price paid for the work by the colliery owners who supply the coal is 25 cents (Mexican) per ton; so that in the case of 2000 tons being loaded, each little Jap for his or her twelve hours' hard and constant work (with no time for meals) would receive 100 cents, equal to two English shillings. "What a primitive method!" one would say; but when one comes to think that vessels of all sizes can be loaded with 2000 to 3000 tons of coal as required in a single day, without an expenditure of capital involving hundreds of thousands of pounds—then, simplicity is best.

Nagasaki Gas-Works.

Upon landing, the writer took a rickshaw to the gas-works, which are situated on the harbour sea-front. The entrance and offices are shown in Photograph No. 135. The offices are situated at the gate; and the writer, upon entering, was delighted to get his first sight of a Japanese gas office. Seated in a row were four little Japanese girls, all in gay costumes, attending to their books; then came three Japs; and finally, from an inner office, appeared a neat, sprucely-dressed Japanese gentleman, Mr. K. Nishijima, the Resident Manager of the works. He could speak very little English; but by signs the writer found out that Mr. Yamanouchi, of Tokio, was the Consulting Engineer, and that the firm named

Photograph No. 135.—Nagasaki Gas-Works' Entrance and Offices.

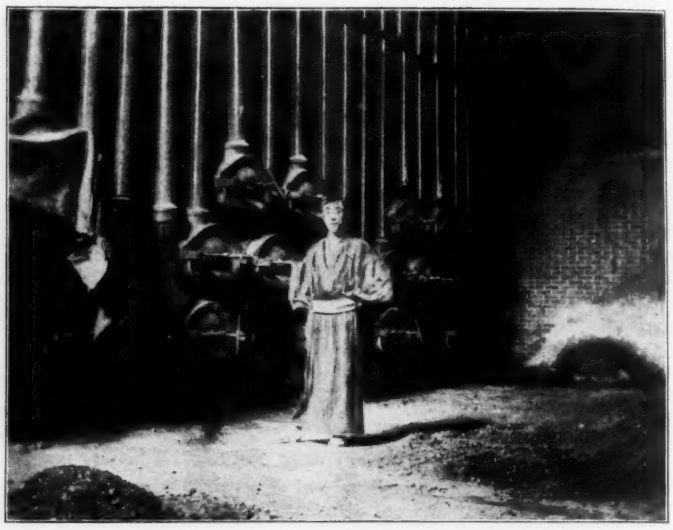
Yamanouchi and Sons now owned the works, which were established about five years ago. At first, the writer's request that he might be allowed to look round the works and take photographs of them, was not acceded to; but after explaining, again by signs and grimaces, that he had visited gas-works in many countries, permission was granted, and both plant and staff were photographed.

All coal is delivered to the works in lighters, and is carried in baskets by Japanese women to the coal-stores, which hold about 200 tons. The coal (Matsushima) is small and very dirty slack, with not a lump to be seen anywhere.

The buildings in the works are all of wood, and call for no description. The retort-house shed contains four beds of seven retorts each, 21 inches by 15 inches and 10 feet long, fitted with luted lids, as seen in Photograph No. 136. The retorts are heated by direct fires. The writer saw the retorts drawn and charged by hand, and must certainly say it would have done credit to many English works. The charges were well burnt-off, and no dirty, tarry matter, or unburnt front portions existed. From the one hydraulic main, the gas goes to the vertical water-cooled annular condenser, 3 feet diameter by 30 feet high.

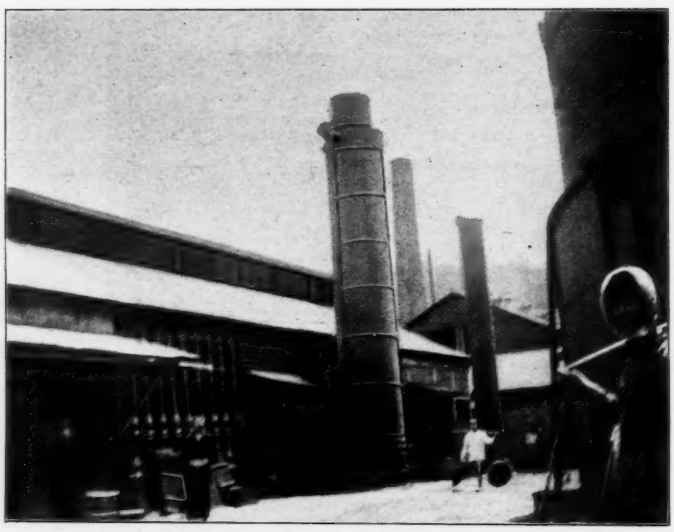
The exhauster room presented a very tidy appearance. It contained a combined engine and rotary exhauster by Messrs. R. & J. Dempster.

The scrubber, 4 feet diameter and 50 feet high, is filled with boards, and stands near the wooden purifier shed containing four oxide boxes, 8 feet square, with dry-sealed covers.



Photograph No. 136.—Nagasaki Retort-Bench.

After a Parkinson meter, comes a Dempster spiral-guided gas-holder of about 55,000 cubic feet capacity. This and other apparatus mentioned is seen in Photograph No. 137.



Photograph No. 137.—Condenser, Scrubber, Purifier-Shed, and Spiral Gasholder at Nagasaki.

The lighting of the public streets is partly done by incandescent gas-lamps, and at night presented from the steamer a more brilliant effect than those streets merely lighted by Japanese lanterns, although not so pleasing to a visitor. Electric light is a keen competitor, though there is an increasing demand for gas for the general lighting of houses.

Owing to the opening of the Port of Moji as a coaling station, a great number of liners call there instead of at Nagasaki, which consequently is not increasing as would otherwise be the case. But a new site has been acquired upon which new works for this town of 70,000 people could be built when the present financial depression in Japan comes to an end.

HAKATA.

On the route from Nagasaki inland, one passes the town of Fukuoka, which with Hakata, forms a community with a population of 65,000 people. The principal industry is in silk goods, which are noted for their excellence of workmanship. A long pier serves the purposes of embarkation on the local steamers; and many interesting temples abound in the district.

There is little to chronicle about the gas-works (which belong to the Hakata Gas Company, Limited), as they are very small indeed, with a roll of 2300 consumers. The Resident Manager is Mr. Y. Kanasawa, who has been with the Company since its formation some three years ago. The works occupy about 1½ acres, with enough room to double the plant. A retort-house, with four beds of direct-fired horizontal retorts, seven in a bed, 8 feet long, carbonizing powdery Sasaguri coal, contains all the producing plant; but extensions are being made, so that by about Christmas the plant for manufacturing purposes will just be doubled. Only a small stock of coal is kept, as the collieries are near at hand. Everything is handled in baskets in the usual coolie fashion. Coke has a good local sale, and fetches 18s. per ton.

Two atmospheric condensers, two Beale exhausters driven by a gas-engine, one tower scrubber, a Livesey washer, and four 10-feet square purifiers, filled with oxide, complete the purification equipment. There are two gasholders—one of 33,000 cubic feet with outside framing, and the other on Dempster's spiral system, holding 100,000 cubic feet.

Tar fetches 2½d. per gallon; and the liquor is sold to local firms for scouring purposes.

The length of gas-mains is 10 miles. Only dry meters are used; and no "slot" meters have as yet been introduced. A few gas-lamps are fixed in the main street; Japanese lanterns being adopted in all other streets. A few Lucas lamps have been installed. The lighting power of the gas is about 14 candles; and its price is equivalent to 4s. per 1000 cubic feet. There is the usual competition with the electric light, which is sold on a basis of hourly consumption.

A little business has been done with gas-cookers and rice-boilers—about 530 customers having them in use. Only a few gas-engines have made their appearance as yet.

The annual make of gas at present is 20 million cubic feet, with a maximum daily output of 98,000 feet. The principal point to record about this Company is the fact that it has a 35 per cent. annual increase; and a substantial output in the course of a year or two is looked forward to. There has been no elaboration in these comparatively new works; and therefore—the capital outlay being kept down—

Photograph No. 138.—Entrance and Office of the Hukiai Works of the Kobe Gas Company, with Mr. T. Shimura, the Engineer and Manager.

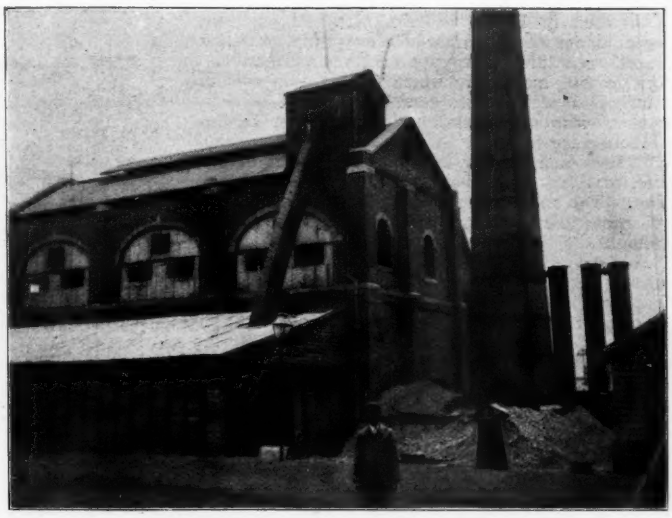
the Company, by continuing the present policy, should possess a sound and profitable Japanese concern.

KOBE.

Kobe, with a population of 40,000, has become the best-known seaport town in Japan. Its seaborne traffic far exceeds that of any other Japanese city. Formerly (about the year 1868) it was a foreign settlement. The whole town is very nicely laid out with trees; the best view being obtained from the Temple on the hill. Photographers, however, have no chance in Kobe, as cameras are prohibited, owing to its being a fortified port. The shipyards were all in full swing, and everything and everywhere had the "hum" of prosperity. Ships having a tonnage of 10,000 tons are launched, and at present [July] the yards are working night and day. The writer was informed there was no trouble through serious strikes, as matters were amicably adjusted by reference to arbitration. There are several works and factories being built, which it is hoped will lead to a rapid increase in the consumption of gas.

The Kobe Gas Company's Hukiai Works.

A large new three-lift gasholder, with latticed braced standards, which was visible upon entering Kobe Harbour, indicated the probable position of the gas-works. Having landed, and not wishing to waste any time, but to meet the requirements of readers of the "Journal" first of all, the writer journeyed by rickshaw to the Hukiai Gas-Works of the Kobe Gas Company, which are the larger of their two works. He was welcomed in excellent English by Mr. T. Shimura, the Engineer and Manager of both works. An attendant entered the room where the writer was seated with the Engineer; and the pleasing Japanese custom of offering tea took place. The writer, ever anxious to fall in with national customs, readily accepted this little courtesy, and the interview commenced with "shop" talk on gas matters.



Photograph No. 139.—Inclined Retort-House with Coal-Store and Elevator.

Photograph No. 140.—Purifier Shed and Boxes.

Leaving the gas-works' entrance office (Photograph No. 138, in which Mr. Shimura is seen), the retort-house for inclineds was first inspected. This is shown in Photograph No. 139, and is a great contrast to the usual light Japanese structures. It is substantially built in red brick to an English design. A coal-store runs alongside the house, and appeared to be large enough to hold about 2000 tons of coal. A storage of only 600 tons is, however, kept in stock. Three different qualities of coal are used—namely, Nanoura, Shogashira, and Ubari—all of which look like unwashed slack, and pack solid in the retort. The last-named coal was heard of by the writer when in India; and it is also used in China. The coal is brought in vessels to the jetty, and from there is carted to the gas-works. An elevator (as seen in the last Photograph, No. 139) is fixed in the coal-store, and raises the coal required to fill a large overhead bunker.

The carbonizing plant comprises four beds of nine inclined retorts each, 20 feet long by 23 inches by 16 inches, Ω-shaped. They are fed from the coal-bunker by "Shoubridge" charging shoots. The charging stage is formed of steel plates and the drawing stage of tiles, with staircases connecting throughout. The furnaces are built, on the regenerative principle, to Mr. S. Y. Shoubridge's design. The coke when leaving the retorts falls down coke-shoots to the ground floor, and is received in barrows and afterwards quenched from buckets; then screened and sorted by women. The complete installation was supplied by Messrs. West's, of Manchester; the building of the furnace and general erection of the plant being done by the Engineer of the Gas Company and his staff.

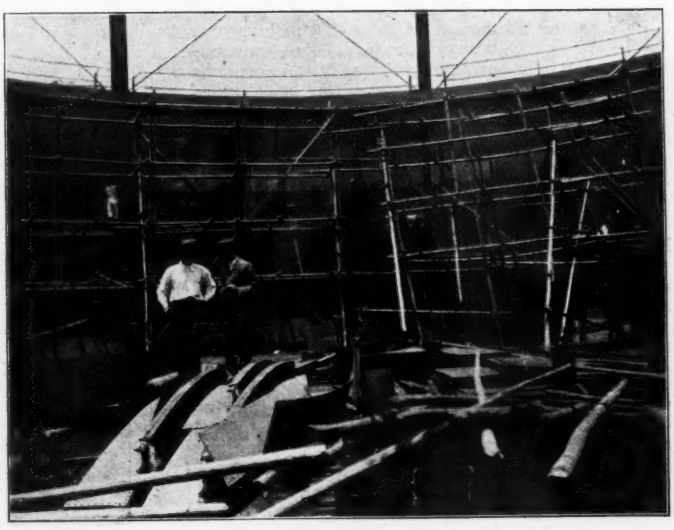
As a hint to contractors, the writer suggests that the erection of all gas plant for Japan be left to the Japanese gas companies, as they are better able not only to deal with the men and their labour troubles, but they also understand the customs of their country. It must not be forgotten that Japan is at present in such a state that no contractor can guarantee working success. As a young nation, it has a large amount of technical pride; and, in addition, law in Japan is very slow and uncertain. So that it is advisable to run no risks with labour troubles, &c.

The condensers at Kobe are four in number, on the annular system, but without the roof or covering usually noticed in other gas-works in the East.

The exhauster-house contains two sets of combined engines and Beale exhausters. Outside, and near by, is a Pelouze and Audouin tar-extractor, placed after the exhausters; and adjacent is a Whessoe Foundry rotary washer, with a tower scrubber, 60 feet high and 6 feet diameter, as a companion.

A peep into the purifier-shed (Photograph No. 140) showed that there were four boxes, 16 feet square and 5 feet deep, filled with oxide from baskets. The shed and roof are strongly designed, and suitable for the hot climate. The covers are on the dry-sealed principle; but the Engineer complains of the short life of the "joint" in this country.

Alongside the purifiers, one sees a busy hive of Japs erecting a gasholder and steel tank; and upon inquiries being made, it was ascertained that the holder and tank were made and delivered by the Whessoe Foundry Company, of Darlington, marked ready for erection, which was being done by the Company's Engineer. The writer went inside the holder (it is

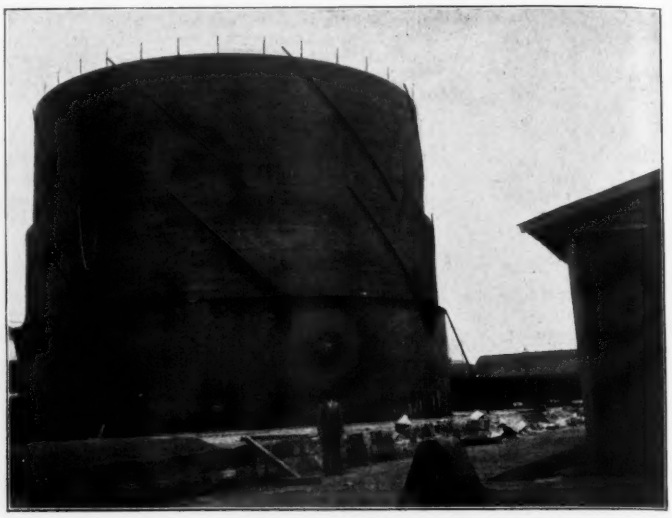


Photograph No. 141.—Inside View of Gasholder and Steel Tank made by the Whessoe Foundry Company and being erected by the Gas Company's Engineer and Staff.

illustrated in Photograph No. 141), and generally inspected the work, and asked if everything was coming together all right. The reply was in the affirmative. The businesslike manner in which the erection was being tackled was a pleasure to see. The holder is 98 feet diameter, with three lifts and lattice braced standards.

Across the yard was a Dempster spiral-guided holder and steel tank (Photograph No. 142), 72 feet diameter; the total capacity of both holders being 650,000 cubic feet. The maximum daily make of these works is 360,000 cubic feet; and their annual output, about 56 millions.

A word about the bye-products. There is a good market for coke, which fetches 9 yen, or 18s., per ton. Tar is sold locally at a price of 9 sen, or 2¼d. per gallon. The writer noticed old kerosine tins being filled with tar; these are soldered up in the usual way, and the tar is sold in this convenient form. Tar in tins is more easily carried on the hand carts which constitute the favourite method of heavy transport.



Photograph No. 142.—Messrs. Dempsters' Spiral-Guided Gasholder in Steel Tank.

Hoigo Gas-Works.

The other works of the Kobe Gas Company are known as the Hoigo Gas-Works, and are older than the Hukiai works. The former were established in 1898; the latter, in 1900. There is nothing much of interest about the plant, which has made 120,000 cubic feet as a daily maximum, and 20 millions in the year. A small retort-house contains three beds of seven horizontal retorts, 8 feet long and 20 inches by 15 inches, heated by direct firing. The charging and drawing are done by hand. After the two condensers, come two Beale exhausters, two tower scrubbers, and four 6 feet square purifiers. There are also two spiral gasholders, having together a capacity of 80,000 cubic feet.

Photograph No. 143.—Householder's Lamp with Name in a Kobe Street.

Street Lighting.

Public street lighting, as we know it, is in Japan practically *nil*, as the law says that every householder or shopkeeper must have a light burning over his door, commencing at dusk and remaining till daylight. This ensures peace and order, as the police also insist that the name of the householder be painted in plain letters on each lamp. This is seen, and a typical street is shown, in Photograph No. 143. Hundreds of lamps, therefore, light up the narrow streets, and give a very pleasing effect to the scene. Besides these compulsory lights, there are others who have additional Chinese and Japanese paper lanterns of varying sizes hung about their premises, which add to the lighting effect. The gas-lamps are very few indeed, and may be used in a thoroughfare where there are only warehouses or go-downs on the wharf.

The total length of gas-mains is about 43 miles; their average depth being 2 feet below the ground level. The lighting power of the gas is 16 candles; and although there is no fixed standard, this illuminating power is uniformly maintained. The price of gas is 2 yen 20 cents, or equivalent to 4s. 5d., per 1000 cubic feet. There is no competition with the electric light.

As regards cookers and gas-fires, a medium trade is done, although the writer believes that, by judicious canvassing and with patience, it is possible to overcome the present prejudice against the use of gas. There is, however, a 20 per cent. annual increase in the consumption, which is only in the lighting. There are now 6000 consumers.

When the works' inspection was over, the Engineer requested the writer to answer several questions regarding the latest methods adopted in England, as the Engineer wished to keep himself up to date with what was going on. He also wished to know the various makers of different classes of apparatus, and was greatly interested in the full information the writer gave him concerning vertical retorts. Mr. Shimura must be congratulated upon the general design of his new gas plant, and on the results obtained from it. His yearly increase necessitates his always having an interest in new methods; and he is determined that his works shall take the fullest advantage of modern plant.

Kobe has a great future before it; and the Gas Company have the right man to keep the Company's interests first and foremost, so as to reap every advantage from increasing consumers and consumption.

Leaving Kobe by rail, the writer decided to make his way inland to Kyoto, which became his head-quarters for a week. The railway journey was of the greatest interest, as it opened up the won- derfully cultivated country on both sides of the line. The whole country is under cultivation as rice fields, sprinkled here and there by small orchards and vegetable gardens; the country looking beautifully green with luxurious foliage, interspersed with collections of bamboo forming small shrubberies. The irrigation is simply marvellous, and is not the result of the adoption of western methods, it having existed for thousands of years. The hills and mountains are cut into terraces, even to the very top; and the water passes from one layer to another until all plots are irrigated. The labour put into this rice cultivation is astounding, and bears no comparison to the easy-going methods adopted in Italy, Egypt, India, and China. All the rice plants when large enough and about 9 inches high are, in Japan, replanted in rows and manured over and over again. It is stated quite openly that, should the towns of Japan adopt modern systems of sanitation, the rice crops would deteriorate considerably in value. It was interesting to see the tall platforms or high towers built for the purpose of

Photograph No. 144.—Street Lighting by Japanese Lanterns in Kyoto.

communicating from them, by means of flag signals, the market price of rice at the various rice exchanges all over the country.

KYOTO.

Kyoto has a population of 500,000 people; but at present there are no gas-works there. It was said that a Company had had a concession for over two years for gas lighting; but unfortunately the financial depression in the country has delayed matters. The Municipality own the electric lighting works, which are situated at the bottom of a movable incline which transports boats or barges from the Kamo River to the Biwa Canal, and *vice versâ*. The street lighting is similar to that in all towns in Japan, and is done by Japanese house-lanterns, some idea of which can be got from Photograph No. 144, which shows a street scene and the lanterns.

On July the 17th was the great festival of "Gion Matsuri," at which the writer was present. Other interesting places visited were the Geisha training school (Nyokoba), where the arts of the tea ceremony, flower decoration, Japanese polite customs, and graceful deportment are, among other subjects, taught; and the Butoku-den Hall, where jiu-jitsu and fencing are learnt. From Kyoto, also, other towns and villages were visited; and palaces, temples, gardens, lakes, and theatres were all seen, in turn with factories and manufactures of various kinds.

CALCULATING AND COMPARING LIGHTS FROM VARIOUS SOURCES.

Under the above heading, Mr. Carl Hering made a lengthy contribution to the proceedings of the Illuminating Engineering Society at their October Convention. The purpose of the paper was "to clarify the apparent mistiness surrounding many of the calculations of lights by giving the formulæ in such a form that they can be directly used for numerical calculations," and generally to explain some misunderstood laws and various terms and expressions used in lighting matters. The paper, issued in pamphlet form, runs to some 33 pages; but the following abridgement will probably indicate the lines on which the author treats the subject, and how far his method simplifies the formulæ and nomenclature of illumination problems.

Mr. Hering first specifies the three more important measures of light as flux or radiation, intensity, and illumination. Briefly abstracted, flux is stated to represent the quantity of light radiation, and to be a very important measure of light, since it is that which is bought, sold, and used. Flux of light is regarded as analogous to flux of magnetism or electricity, and physically the same thing as power. The unit of measurement is the spherical candle, termed by the author the "common unit," in contradistinction to the "official unit," the lumen, which only differs from it in numerical value. The author considers the lumen as the more desirable unit, as being simpler and less confusing than the candle. The expression "intensity or brightness of light" is well known, and is usually measured in candle power. The real physical meaning of candle power is, according to the author, flux density expressed in terms of a solid angle, and it does not refer to any particular quantity of light flux or illumination. If understood to represent a flux density under the name of candle power, intensity may sometimes assist in a clearer comprehension of problems occurring in practice. The laws dealing with candle power refer to radiations issuing from a point in straight lines. In cases of sources other than a point, the candle power might be better expressed as "apparent" or "equivalent;" the laws concerning these not being in all respects the same. The common unit of intensity is given as the candle, and the official unit as the hefner.

Illumination, of which one foot-candle is stated to be the common, and one lux the official, unit, is defined as "the amount of flux of light passing through a unit of area like a square foot—that is, the flux divided by the cross section—and is therefore an expression of the density of the flux or the flux per square foot." The author regards the term "illumination" as misleading, and tending to limit the conception of the real quantity. He prefers to apply it to any part of a beam of light—whether or not there exists a body on which it may fall. Should the light be intercepted by any such body, the latter is illuminated by it; the illumination being measured in the same units as the flux density. The unit is usually called the foot-candle, and is the flux per square foot at one foot from one candle. Here it would appear that the author is employing the expression "foot-candle" in a sense not usually understood, and rendering the determination of the light received on an object both difficult and confusing. Since the eye does not directly look at all points of a square foot at the same moment, it seems sufficient to regard the light illuminating any object as of the value of one or more foot-candles irrespective of area. The phrase is a simple and well-understood one. Generally throughout the paper there appears to be the wish to express everything—intensity and illumination alike—on a square foot basis; and it is difficult to see the purpose served.

Continuing, the author remarks that a body intercepting the illumination or beam of light may more or less reflect light; and the reflected light is also flux, and, coming from a specific surface, has flux density. What is termed illumination therefore applies also quite correctly to the light reflected from a surface, and must be considered. He suggests that the two illuminations, although of the same character and both measurable in foot-candles, might be distinguished by the names "incident" and "reflected;" the difference between them being absorption. The measure called illumination can be used for any light whether it be a beam from a point, a white reflecting surface, a transmitting medium like ground glass, or for such light as daylight, the surface of a flame, &c. All such superficial lights may be correctly expressed and measured in illumination units—namely, foot-candles. The other unit in which flat sources of light are often expressed and measured—namely, "candle power per square inch"—is unnecessary and misleading; the unit of illumination can always be used instead of it. From the last remark, it will be further seen in what sense the author proposes to use the term "foot-candle"—giving it a double meaning which can only cause difficulty.

Mr. Hering then proceeds to show the fundamental relations existing between the three measures dealt with; and he gives the following equations:—

$$\text{illumination} = \frac{\text{intensity}}{\text{distance}^2} \qquad (1)$$

$$\text{flux} = (\text{intensity}) \times (\text{solid angle})^* \qquad (2)$$

$$\text{illumination} = \frac{\text{flux}}{\text{surface}} \qquad (3)$$

As the quantity called the "solid angle" gives rise to some uncertainty and confusion, the author says it can be eliminated by remembering that

$$\text{solid angle} = \frac{\text{surface}}{\text{distance}^2}$$

Hence the second fundamental formula (2) becomes

$$\text{flux} = \frac{(\text{intensity}) \times (\text{surface})}{\text{distance}^2}$$

Formulæ may be developed from these relations for the determination of actual numerical values in terms of specific units. If the common units are employed, the first formula will give the illumination directly in foot-candles; the intensity being expressed in candles, and the distance in feet.

Hence, $\text{foot-candles} = \frac{\text{candles}}{\text{feet}^2}$.

In dealing with the second fundamental formula, the troublesome solid angle is used; and differences of opinion occur as to the unit which should be employed. In the one case, the absolute, this is the angle equal to that of a cone which subtends a unit of area like a square foot at a unit distance of one foot; the unit of flux being the lumen. In the other case, where the unit of flux is the spherical candle power, the solid angle is represented by the whole sphere. With the latter, the second formula (2) becomes: Spherical candles = (mean) candles. With the lumen unit of flux, the formula is: Lumens = $4\pi \times$ (mean) candles.

These formulæ refer only to a light radiating in all directions. For beams of light radiating in a limited direction, the formulæ become

$$\text{spherical candles} = \frac{\text{candles} \times \text{sq. ft.}}{4\pi\ \text{feet}^2} = 0{\cdot}07958\ \frac{\text{cp.} \times \text{sq. ft.}}{\text{feet}^2}$$

While in terms of lumens it becomes

$$\text{lumens} = \frac{\text{candles} \times \text{sq. ft.}}{\text{feet}^2}$$

The two different measures of flux may be converted from one another by the following equations:—

$$\text{lumens} = \text{spherical candles} \times 4\pi$$

$$\text{spherical candles} = \text{lumens} \div 4\pi.$$

The author further indicates what we were almost going to say the hopelessness of his work of "clarification" and the inadvisability of at present introducing any new terms and meanings by stating that the "lumen" as used on the Continent is based on the hefner unit; while the same term in the States has a candle basis. His equation for conversion is

$$\text{common lumens} = \frac{\text{official lumens}}{0{\cdot}88} = 1{\cdot}136\ \text{official lumens.}$$

Referring next to the third fundamental formula (3), it is stated that this, when reduced to common units, becomes

$$\text{foot-candles} = \frac{4\pi\ \text{spherical candles}}{\text{square feet}}$$

Or in lumen units

$$\text{foot-candles} = \frac{\text{lumens}}{\text{square feet}}$$

Mr. Hering then explains the difference between diffused and directed light; finishing with the remark that the former follows the laws of radiation from a surface and the latter those from a point. There are in general three kinds of light sources—a point, a line, and a surface—the laws concerning which are in some important respects different. In cases, however, of small lines and surfaces, they may be practically treated as point sources. The differences in the respective laws are indicated as follows: The illumination produced at any place by a theoretical point of light

* A solid angle is an angle in space like that at the point of a cone, or at the source of a conical beam of light.

varies inversely as the square of the distance to that place, while for a theoretical line of infinite length, it is inversely as the distance and for a theoretical surface of infinite extent (such as the sky) it is independent of the distance, being the same everywhere in space. Or to put these into practical formulæ in which numerical quantities can be substituted, and using as units the candle, foot, and foot-candle (illumination unit) these laws are:

$$\text{For a point, foot-candles} = \frac{\text{lumens}}{4\pi\,\text{feet}^2}$$

$$\text{For an infinite line, foot-candles} = \frac{\text{lumens per foot}}{2\,\pi\,\text{feet}}$$

For an infinite surface, foot-candles = lumens per square foot.

This latter simply means that when an infinitely large light-giving surface like the sky illuminates a second surface, then the illumination of that second surface expressed in foot-candles is numerically the same as the lumens per square foot of the light-giving surface, no matter what the distance. They both have the same flux density.

The other important differences between point, line, and surface sources refer to the total flux from the source when this flux is calculated, as it usually is, from the normal measured (mean) apparent candle-power. Using the lumen as the unit of flux and assuming again that the candle-power of the source is that value measured by the photometer, normally, when it is a line or surface, then the formulæ are:

For a point, lumens = candles $\times 4\pi$

For each foot of the infinite line, lumens = apparent candles (of whole line) $\times 2\pi \div$ feet

For each square foot of the infinite surface to one side only, lumens = apparent candles (of whole surface) at 1 foot.

The latter simply means as before, that they are merely equal numerically. The author remarks, however, that, in practice, sources are neither points, nor infinite lines, nor surfaces, since most artificial lamps can generally without appreciable error be treated as points if placed (as they usually are) far enough away from the surface to be illuminated. Some little consideration is then given to a finite length of line and extent of surface for the purpose of showing how they differ from point sources.

Mr. Hering next discusses the measure called "the brightness of the source" which is frequently used, and was included among those determined upon by the 1896 Geneva Congress. This is usually expressed in candles per square inch. The author again repeats that he regards this as unnecessary and confusing, considering it as a unit of the same kind as illumination when measured in foot candles. While not employing it himself, he has no great objection to its use so long as it is taken to express flux and not flux density. It can be shown, he says, that numerical values expressed in terms of this unit can be reduced to the more common unit, foot-candles, by the following formula:—

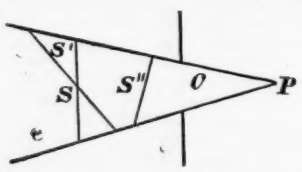
$$\text{foot-candles} = \frac{\text{cndls per sq. in.} \times 144}{1/\pi} = 452 \times \text{cndls. per sq. in.}$$

An interesting relation is stated to follow from the above formula, namely, the candle-power equivalent of a foot-candle of illumination." Every square foot of surface illuminated to the amount of one foot-candle will, if measured on a photometer perpendicularly to the surface (and assuming the reflection is perfect), have an equivalent or apparent candle power of 1π—that is, 0·3183—or about ⅓-candle. Hence the apparent candle-power of an illuminated surface, or of an original source of light in the form of a surface, can be calculated from the illumination by the following formula:—

$$\text{apparent candles} = \text{foot-candles} \times \text{sq. ft.} \times 0{\cdot}3183.$$

This formula is often of use; but it must be distinctly understood that this is merely an equivalent or apparent candle-power (of a flat surface and not a point) which will produce the same illumination at the place at which it is measured as a lamp of that many candles would produce. Some deductions are made from the use of the cosine law, the chief of which is the following:—

If a uniformly bright surface S is looked at or photometered from any point P, through a definite opening O in an opaque screen, then the light reaching P is found to be independent of the inclination of the surface S with the axis of the beam, as S′ for instance, or of its distance from the point P or from the opening O, as S″ for instance, provided only that the surface is always large enough to completely cover the field seen from P through O—that is, provided the opening seen from P is always completely filled with light. Hence the light



from the opening, measured at P, will be constant, depending only on the brightness but not the extent or distance of the surface S. Therefore to measure the light given off per square inch of surface, be the surface a direct source of light like heated metal, or indirect like a white wall, or indefinite like a cloud, or the sky, &c., and be it near or far, inclined or not, accessible or inaccessible, make a hole, say of 1 sq. in., in a screen and measure the candle-power of the light coming through this hole with a photometer in the usual way as though the hole were the source, being sure that each part of the hole has a light-giving surface behind it. The candle-power thus measured, is equal to that of one square inch of the source itself.

The illumination produced by the light from such a small illuminated opening, normally to it, will be inversely proportional to the square of the distance from the opening to the point P. It differs from a point of light precisely as an illuminated surface does; hence the flux from it will be only one-fourth of that of a point source of the same candle power.

Mr. Hering devotes the remainder of his paper to numerical illustrations of the formulæ. He is careful to say that whenever a source of light, direct or indirect, can have its mean candle power measured in all directions by a photometer, it is best to adopt this method. We do not propose to follow the author through his various examples, which occupy some pages. Many of them appear to be of academic, rather than of practical, use. Starting with the total or fractional flux of a light source in spherical candles or lumens, as the case may be, some curious values are calculated. One instance will be given: A lamp filament 6 inches long and 0·003 inch in diameter has a surface of 0·0004 square foot; the flux density per formula is 156,000 foot-candles. The fact that if an electric light user can flatten his lamp filament out to a square foot of surface he will get all these foot-candles, does not come into practical lighting politics. The basis of mean spherical candle-power seems, too, of little service in the calculation of light where the rays are principally in (say) the lower hemisphere. The total flux data may be, and are, of use in the problem of bringing, by means for instance of reflection, the whole of the light to play where really required; but the author will scarcely get assent when he says that all the data which are needed can be deduced from the true mean candle power. In any case, the comparatively simple graphs and equations in ordinary use will be found by most to solve the great majority of, if not all, the lighting problems which arise in practical work. The author himself helps to such a conclusion when he says that many of his calculations are necessarily only approximate, since exact conditions are never fulfilled and most illumination questions neither permit nor require great accuracy.

The paper concludes with an appendix recapitulating, and adding variants to, the equations given in the text.

In discussion, several points advanced by the author met with severe criticism. The definition of one of the fundamental units, for instance, was questioned by Dr. Sharp, who, speaking of mean spherical candle power, maintained that this was a measure of the intensity, and not, as Mr. Hering stated, of the flux of light.

An Appointment for Mr. John Terrace.

The Directors of the Great Grimsby Gas Company have appointed Mr. John Terrace, the Assistant Engineer and Manager of the Tottenham and Edmonton Gas Company, Manager in succession to Mr. J. Broadhead, who has resigned. Mr. Terrace, who s a son of Mr. David Terrace, of the Middlesbrough Gas-Works, received his early training under his father, and at the works of Messrs. Ashmore, Benson, Pease, and Co., of Stockton-on-Tees. He was then for five years in the service of Messrs. Humphreys and Glasgow, of Westminster, during which time he gained an intimate knowledge of up-to-date business methods and engineering. Besides superintending the erection and putting to work of many plants in England, he erected two carburetted water-gas plants at Sydney (N.S.W.) and one at Dunedin (N.Z.). While in Australia, Mr. Terrace took charge of the Mortlake works of the Australian Gaslight Company, during the absence of the Engineer; and for this he duly received handsome recognition and thanks from the Directors of the Company. Coming back to England by America, afforded him an opportunity of visiting many of the gas-works in the United States, and studying the different conditions and methods of work there. In 1902, he was appointed Assistant-Engineer to the Tottenham and Edmonton Gas Company; and the progressive policy of that undertaking in all its departments, necessitating the carrying out of large extensions to deal with the increased demand for gas, has afforded him a training and experience which must eminently fit him for his new post. Mr. Terrace will carry with him the good wishes of his many London friends for success and prosperity in his new sphere.

London and Southern District Junior Gas Association.—At the second general meeting of the Association for the present session, which will be held at the Cripplegate Institute, Golden Lane, E.C., next Friday, two short papers will be read—on "Fallow Ground," by the President (Mr. W. J. Liberty), and on "Rule of Thumb as Applied to Gas-Works Chemistry," by Mr. J. Hewett. Arrangements have also been made for the members to visit the Old Kent Road works of the South Metropolitan Gas Company on Dec. 5. It is proposed to assemble at the works about 3 o'clock.

High-Pressure Gas Lighting in Fleet Street.—A commencement has been made by the Gaslight and Coke Company with the work in connection with the above, by laying through the whole of Fleet Street and the eastern portion of the Strand, a 6-inch main to connect with their power-station in Essex Street. The laying of the main was started at Ludgate Circus last Thursday morning, and is being continued day and night and on Sundays by double gangs of men; the gas used for testing as the work proceeds being taken from the 10-inch high-pressure main at Ludgate Circus, with which the new main has been temporarily connected.

COMPARISON OF HIGH POWER GAS AND ELECTRIC LAMPS FOR STREET LIGHTING.

A recent number of the "Journal für Gasbeleuchtung" contained an exhaustive report by Dr. L. Bloch, of Berlin, on a series of investigations which he has carried out on the illumination of the surface of streets in Berlin by different modes of lighting.

The investigations are in continuation of a series reported in 1906, in which Dr. Bloch essayed to show that high-pressure gas lighting, as carried out with upturned burners prior to that date in the streets of Berlin, was not so satisfactory, or so economical, as lighting by ordinary arc lamps run on a direct current circuit. The conclusions drawn by him from his former series of investigations were criticized by Professor H. Drehschmidt, who showed conclusively that in respect of illumination the high-pressure gas lighting of Berlin was superior to the lighting by electric arc lamps. Since the date of the former report, and the discussions which followed its publication, great advances have been made in the street lighting of Berlin, both by gas and by electricity; and Dr. Bloch, in the series of investigations now reported, has studied the relative merits of the later types of lamps employed. The comparisons which he makes would be extremely valuable were it not for the evident bias which he shows in favour of electric lighting. For instance, in comparing the cost of the two methods of illumination, he assumes that when gas is supplied for public lighting at a price of 9 pf. per cubic metre (equal to 2s. 6½d. per 1000 cubic feet), electric current is to be had at a price of 12 pf., or a little under 1¼d. per unit. Even taking these prices, which are obviously greatly in favour of electricity, and taking also the disposition of electric flame arc lamps in the middle of a narrow roadway and at the height most favourable to them, and calculating therefrom the probable illumination of a wide roadway where the same lamps are placed alternately on either side walk, he is only just able to prove to his own satisfaction that the flame arc lamps are more economical in respect of the horizontal illumination of the surface of the roadway than the high-pressure inverted gas-lamps which are now in extensive use in Berlin.

The results obtained for the illumination of the surface in the Potsdamer Strasse, where inverted high-pressure lamps are used, supported at a height of 5⅛ metres (18 feet) above the roadway, and with the standards 40 metres (130 feet) apart at the edge of each footway, may be quoted. The total width of the street is 36·6 metres (120 feet). Each lamp standard supports three burners, each consuming 800 litres (28¼ cubic feet) of gas per hour, which is equivalent to a consumption of 328 litres per hour per 100 square metres of road surface (1·076 cubic feet per hour per 100 square feet). The mean illumination of the street surface was 17·3 lux; the maximum being 123 lux, and the minimum 1·7. [One lux is equal to 0·0848 candle-foot]. The rate of consumption of gas per lux per 100 square feet of road surface lighted was therefore, on the average, 0·06 cubic foot per hour. In the Königgrätzerstrasse, which is only 28·5 metres (93 ft. 6 in.) wide, and where the standards on each side of the roadway are 42 metres (138 feet) apart, the mean illumination of the road surface is 18 lux; the maximum being 99 lux, and the minimum 1·9. In this case, the burners are at the same height above the pavement; but each standard supports only two—each having a consumption of 1200 litres (42·4 cubic feet) of gas per hour. The consumption per 100 square feet of road surface is therefore 1·3 cubic feet per hour, or, per lux per 100 square feet, 0·07 cubic foot per hour.

The comparative figures obtained by calculation for flame arc lamps, with Alba carbons, supported at the same height from the roadway and in the same positions in a street of the width of the Potsdamer Strasse, are, a mean illumination of 23·1 lux, with a maximum of 132·3 lux, and a minimum of 2 lux. The consumption in this particular case would amount to 112 watts per hour per 100 square metres of road surface (10·405 watts per hour per 100 square feet); and therefore the consumption per lux per 100 square feet would be 0·455 watt per hour. Dr. Bloch computes, however, that the same flame arc lamps would give as high, or slightly higher, average illumination as the inverted high-pressure gas lights if they were suspended at a height of 7 metres (23 feet) from the roadway; while the difference between the maximum and minimum illumination would be considerably reduced. He calculates also that another type of flame arc lamp, spoken of as intensifying, if likewise suspended in the same conditions at a height of 7 metres (23 feet) from the road surface, would give a mean illumination of 20·7 lux with a consumption of 5·4 watts per hour per lux per 100 square metres of surface (0·5 watt per hour per lux per 100 square feet).

Dr. Bloch also made observation of the ordinary low-pressure inverted gas-burners in the Invalidenstrasse, which were placed at a height of 4½ metres (14 ft. 9 in.) from the pavement, with a distance between the columns of 28 metres (92 feet). The width of the street is 17 metres (55 ft. 9 in.). There were four burners on each column, each consuming 114 litres (4·026 cubic feet) per hour. The mean illumination of the surface of the roadway is 5½ lux; the maximum being 58 lux, and the minimum 0·6 lux. The consumption per 100 square metres works out at 192 litres per hour (0·629 cubic foot per hour per 100 square feet), or per lux per 100 square feet per hour 0·1148 cubic foot. Observations were also made on the upturned high-pressure gas-lamps in the Alexanderstrasse, and the Königstrasse, and on the ordinary electric arc lamps in the Friedrichstrasse.

Summarizing the results of the observations, and certain figures computed for comparative purposes from other observations, the following table shows the consumption per hour of gas or electricity for an illumination of 1 lux per 100 square feet of road surface in the conditions in which the methods of lighting named are applied in the streets of Berlin.

TABLE I.

Description of Lighting.	Height of Lamps from Roadway.	Position of Standards.	Consumption per Lux per 100 Square Feet of Road Surface.
Gas.	Feet.		Cb. Ft. per hour.
Inverted high pressure (1) . .	18	Edge of footway	*0·062
,, ,, ,, (2) . .	18	,, ,, ,,	*0·072
Upturned ,, ,, (1) . .	18½	,, ,, ,,	*0·170
,, ,, ,, (2) . .	18½	,, ,, ,,	*0·157
Inverted ordinary ,, . . .	14¾	,, ,, ,,	*0·115
Upturned ,, ,, . . .	11½	,, ,, ,,	†0·128
Electricity.			Watts per hour.
Ordinary arc, with pure carbons	32¾	Middle of roadway	*1·70
Flame arc, with alba carbons (1)	32¾	,, ,, ,,	*0·64
,, ,, ,, ,, ,, (2)	23	Edge of footway	†0·48
,, ,, ,, ,, ,, (3)	18	,, ,, ,,	†0·46
Intensifying flame arc (1) . .	59	Middle of square	*0·60
,, ,, ,, (2) . .	23	Edge of footway	†0·50

* Results of direct observations. † Results obtained by calculation.

In computing the total cost of street lighting by the different means, Dr. Bloch takes the cost of service and of renewals on the following bases: He assumes that the service and renewal charges for the high-pressure gas-lamps will amount to 30 per cent. of the cost of the gas consumed, and that for the flame arc lamps they will amount to as much again as the cost of current. He admits, however, that he has no definite information on which to base these charges. If, however, we accept them and take the cost of gas for street lighting at 2s. 6d. per 1000 cubic feet, and the cost of electricity at 3d. per unit, and attendance and renewal charges at the proportions assumed by Dr. Bloch, we obtain the following figures for the comparative cost of street lighting on the basis of the same average illumination of the surface of the roadway. The cost of lighting by high-pressure inverted gas-lamps is taken as unity.

TABLE II.—*Comparative Cost of Different Means of Lighting.*

Description of Light.	Relative Cost for Same Mean Illumination of Street Surface.
Gas—	
Inverted high-pressure	1·00
,, ordinary pressure	1·71
Upturned ,, ,, ...	1·90
,, high ,, ...	2·44
Electricity (direct current)—	
Flame arc	1·40
Ordinary arc	3·83

The figures in this table are deduced from the results of the direct observations, except in the case of ordinary upturned incandescent gas lighting, for which Dr. Bloch had only calculated values available.

It will be seen that, despite the low charge of 3d. per unit for current, and the fact that the electric lamps are situated in the middle of the roadway (which favours the average theoretical illumination of the surface of the roadway, though it is well known to be unsuitable as soon as there is traffic in the street), even the flame arc electric lamp is shown by Dr. Bloch's measurements to be much more costly than inverted high-pressure gas-lamps.

The Manchester and District Junior Gas Association on Tuesday last held their first "Coffee Meeting" at the City Café Company's rooms, Deansgate, Manchester. Mr. J. Taylor, the Vice-President, was in the chair; and there was a good attendance of members. Mr. F. Thorp read a paper, in which he gave his personal experience in connection with incandescent gas lighting with low, medium, and high pressures. A conversational discussion followed, which it was determined should not be reported. So instructive, however, did the members present find this form of meeting that it was decided to hold another "Coffee Meeting" on Jan. 19.

A Paper to Supersede Mantles.—According to the Milan correspondent of the "Daily Chronicle," Professor Pierucci, of the University of Pisa, has invented a new species of paper "which is destined to revolutionize the present system of lighting, besides having numerous practical uses in electrical development, owing to its remarkable conductive powers." It is stated that the Professor's invention is shortly to be placed on the market in a form which is intended to supersede the mantle used for incandescent gas lighting; and it is claimed that the new article will be much less perishable and much more powerful as a light-giver, besides being considerably cheaper.

PHYSICAL THEORY OF COAL CARBONIZATION.

As already mentioned in the "JOURNAL," one of the papers read at the recent meeting of the American Gas Institute was on the above subject; the author being Mr. W. H. Fulweiler, of Philadelphia. The communication was of considerable length, and was accompanied by an equally long appendix, containing a number of references, tables, diagrams, &c. The following abstract embraces the principal points dealt with.

The author commenced with a short historical introduction, and then passed on to consider the different methods of supplying heat for carbonization. On the subject of the distillation of coal in closed fire-clay retorts, externally heated, he pointed out that there were three ways in which the process might be conducted. The first was by using relatively small thin charges, partially filling the retort, and leaving considerable free space, as in ordinary horizontal retorts; the second was by employing a relatively large thick charge with a free space, as in the coke-oven or chamber; and the third was by completely filling a retort, as in the vertical system, so that there would be no free space. With any one of these methods there were, he said, generally six factors which influenced the course of the distillation: (1) Size of the particles of coal; (2) Moisture content; (3) Actual temperature employed; (4) Volume of the charge relative to containing capacity; (5) The time during which the charge is heated; (6) Pressure under which distillation takes place. By tracing these back to their origin, they might be simplified into three main effects—viz., time, temperature, and pressure. In other words, under any given condition of temperature and pressure, it was the rate at which the heat penetrated the coal particles, and the time the gaseous vapours were exposed, that determined the course and results of the distillation.

Mr. Fulweiler then went on to explain the three general stages of coal carbonization in retorts, and to deal with the composition of coal and its residual products, the flow of heat into the retort and the charge contained in it, and the variations in temperature taking place during the process of distillation. On these subjects, he made the following remarks: When we introduce a charge of coal into a hot retort, the first effect is, of course, an immediate reduction of the temperature of the interior skin of the retort as the heat is absorbed by the cool charge. Experiments have shown that heat penetrates through the charge between four and five times as rapidly by conduction as by radiation. This argues for a completely filled retort, in which case the primary transmission is entirely by conduction. Under the influence of heat, some gas is immediately evolved, even at temperatures as low as that of boiling water; in fact, all coal contains some occluded gases that may be removed in a vacuum even at the ordinary temperatures. As the temperature rises, however, liquid products, principally water with some tarry matter, begin to come off. The coal now seems to partially fuse, and the distillation proper may be said to begin.

A number of experiments have been made to locate this starting-point; and it may be assumed to be about from 660° to 700° Fahr. at the start, and to remain nearly constant until this first stage is completed, when it rises to 750° to 800° Fahr., at which temperature the coal could be converted into coke. We may therefore consider that carbonization of the first stage progresses with an isothermal line of (say) 725° Fahr. in the coal.

We have been dealing simply with the layer of coal which is in immediate contact with the sides and bottom of the containing vessel. When we come to consider how this heat of carbonization penetrates through the charge proper, we have a number of conditions to take into account. Even if the charge were a monolith, it would require almost twice the usual time for the heat to penetrate by conduction alone;* so we are forced to assume that about half the heat is transmitted by the hot vapours, heating the coal as they pass through the charge. It is in this respect that we find a fundamental difference in the three methods usually employed in carbonizing.

The accompanying diagrams (figs. 1 to 3) show the progress of coal carbonization when carried out in horizontal and vertical retorts and in coke-ovens.

It will be seen that in the horizontal retort the heat penetrates much more quickly than in a completely filled retort, not only on account of the smaller bulk of the charge, which causes less preliminary cooling, but also of the fact that the heated gases may circulate more freely. The relative rate of carbonization towards the centre of the charge has been estimated at 1 inch to 1·5 inches per hour in horizontal retorts working at a high heat, 0·5 inch to 0·6 inch in vertical retorts, and 0·3 inch to 0·5 inch in coke-ovens. This rapid heating shortens the first and second stage of the distillation process, and alters to a very considerable extent the character of the second stage, as the products are exposed to higher neighbouring temperatures.

The factors that influence this rapidity are the available head of heat, the size of individual particles of coal, and its moisture content. The first depends upon the actual temperature of the retort walls and their heat capacity—*i.e.*, the volume multiplied by the specific heat—their conductivity, and the heat head, or the temperature difference between the interior and exterior of the retort. We have very few data regarding the conductivity or the specific heat of fire-clay materials at high temperature; and much of the information furnished is contradictory. In general, however, we believe that the specific heat of fire-clay material is not far from ·20.

M. Euchène has calculated the hourly rate of heat transmission through a horizontal retort. His figures, reduced to English units, were as follows for a charge of 350 lbs.:—

	B.Th.U.
1st hour	127,732
2nd ,, ...	60,109
3rd ,, ...	55,423
4th ,, ...	43,353

Considering that the internal periphery is 66 inches, the internal surface is 49·5 square feet; and assuming a combustion chamber temperature of 2000° Fahr., and the coefficient of conductivity of

* M. Guéguen, "The Chemical Theory of the Production of Illuminating Gas." See "JOURNAL," Vol. XLIII., p. 915.

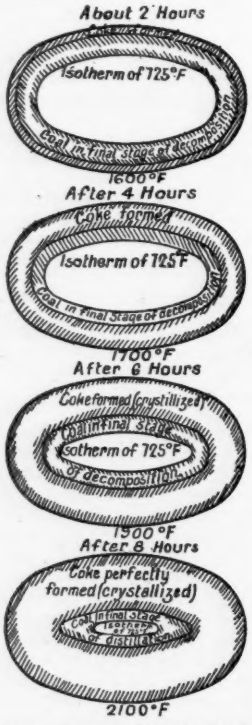


Fig. 1.—Progress of Carbonization in Vertical Retorts.

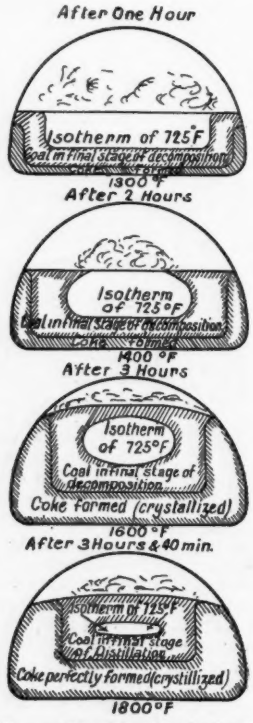


Fig. 2.—Progress of Carbonization in Horizontal Retorts.

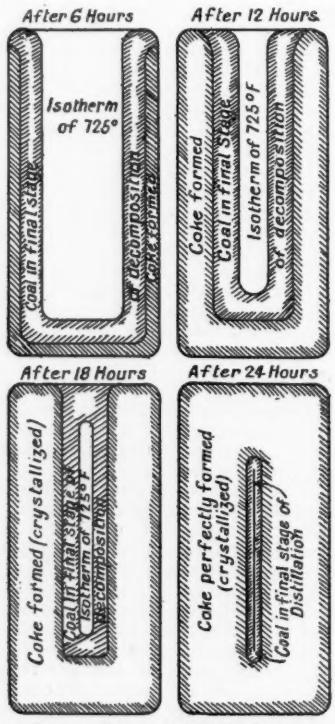


Fig. 3.—Progress of Carbonization in Coke Ovens.

11·25 B.Th.U. per square foot per degree per hour, this would correspond to the following internal temperatures:—

	Deg. Fahr.
1st hour	1341
2nd ,,	1676
3rd ,,	1701
4th ,,	1768

These figures seem to correspond quite closely with observed results. It all goes to show that if we wish to secure the maximum rate of transmission of a line of temperature of 725° Fahr. through the coal particles, we must first bring them into intimate contact with the heated surface, and also allow a certain percentage of voids for the circulation of the gases.

The actual size of coal has been investigated with relation to its influence on carbonization. It has been shown* that the maximum size of a lump of coal that would be properly carbonized at the centre in four hours is a sphere of 2½ inches in diameter. This point is important in considering the adjustment of coal-crushers. From practical tests, it has been proved to be the case that the larger the size of the coal (when of uniform size), up to a certain point, the higher the candle-feet.† This we also see in the increased candle-feet from ¾-inch screened coal as against run-of-mine coal, even allowing for the additional percentage of ash in the latter. The principal object to be desired then, is to quickly raise the coal to the point of carbonization, and drive off the evolved gases. To a certain extent, the effect of the pressure is felt here. Experiment has shown that an increase of pressure in the retort considerably lengthens the time required for distillation, and the effect of a vacuum is to shorten it.

In considering the effect of heat upon the products after distillation, we find that when the gaseous vapours have been evolved from the coal, and are acted upon by the radiant and conducted heat of the charge and the containing vessel, the more important changes are commenced. The general result of increasing temperatures seems to be a decrease in the illuminants, methane, and tar, and an increase in the hydrogen, carbon and naphthalene, and the higher cyclical compounds. We must, however, remember the important fact that the decrease in the percentages of the illuminants, and more especially of the methane, is to some extent due to the actual increase in volume which results from the decomposition of a hydrocarbon into its elements. In the tars, the great increase in the pitch, due to some extent to the increase in free carbon, tends to mask the increase in anthracene, while the naphthas and light oils almost disappear. Carried then to an eventuality, we should have, at a temperature high enough, practically pure hydrogen in the gas and carbon in the tar. A pronounced drop in illuminating power occurs when the outer layers of coke have reached 1600° to 1800° Fahr.

In coke-ovens, experiments have shown that samples of gas taken at different points from the edge to the centre of a charge did not show any benzol at the edge to 0·8 per cent. at the centre. In other words, we do not require any free superheating space to make benzol, if we can raise the temperature of the coal to 1300° Fahr. This has an important bearing on the course of distillation in vertical retorts, where no free space exists. It was at first claimed that these retorts could not produce satisfactory illuminating gas, as there was no free space, the radiant heat of which was held to be essential to the formation of the benzol compounds. With a fair American coal, we have obtained as high as 15·7-candle power gas from our vertical retorts. Benzol is itself stable up to about 1650° Fahr. But apparently even below this temperature—say, at 1500° Fahr.—the polymerization towards benzols ceases markedly; and it is not because the benzol is decomposed, but because it is no longer formed, that causes the decrease. Experiments made on the polymerization of the benzol homologues show generally but a slight formation of gaseous compounds, except at extremely high temperatures; and then their products are principally carbon and hydrogen.

The other gaseous products formed during carbonization are ammonia, cyanogen, sulphuretted hydrogen, and bisulphide of carbon. The ammonia and sulphuretted hydrogen are exothermic, while the others are endothermic. These qualities determine their appearance in the carbonization. The ammonia and hydrogen sulphide both appear early in the distillation, soon reach their maximum, and then rapidly decline—the ammonia somewhat faster than the sulphuretted hydrogen; while the cyanogen and carbon bisulphide increase as the temperature rises. A good deal of work has been done in connection with the decomposition and formation of ammonia and cyanogen from the nitrogen in the coal, especially as to the effect of neutral gases, such as steam, on the direction of the reaction. At present we feel warranted in assuming the primary formation of ammonia to result from a breaking-down of a nitrogenous ring compound (resembling perhaps the ferrocyanides) in the coal during the second stage of the process of distillation.

With regard to the gasification of tar (which the author dealt with at some length) the solution of the problem lies in exposing it to an extremely high temperature, and filtering out the free carbon, as is done in the methane-hydrogen process of Messrs. Lewes and Tully; but at the present time it seems more economical to make as little as possible, as in the vertical retorts, and work it up into bye-products.

So far we have been considering the effect of temperature alone. If I now introduce the effect of the time of exposure, other complications arise. The contact time in a horizontal retort may be approximately estimated as follows: We will assume a ⏢ retort 15 in. by 26 in. by 9 ft. 1 in. long, burning off 360 lbs. of coal in four hours, with average hourly retort temperatures of 1200°, 1400°, 1600°, and 1800° Fahr. respectively, and a yield of 5 cubic feet of gas per pound. We will assume also the hourly makes to be 43·4, 31·6, 18·8, and 6·2 per cent. respectively. We should find by calculation that the average time of exposure is 10·7 seconds during the first hour, 11·5 in the second, 14·9 in the third, and 45·9 in the fourth, with an average of 13·9 seconds for the whole charge. As the time of exposure increases, the temperature also increases. Thus it is probable that some of the gas at the early portion of the charge has not been thoroughly decomposed; while the later portions of the charge have been over-exposed to heat and decomposed.

Considering, again, the relation of the size of the charge to the cross section of the retort, we have two opposing facts; the smaller charge giving more free space, and consequently longer exposure, while the more rapid evolution of gas tends to decrease this time. Furthermore, with the very small free space allowed by the large charge, we intensify the effect of surface decomposition, which has been shown to be of the greatest effect on the hydrocarbons.

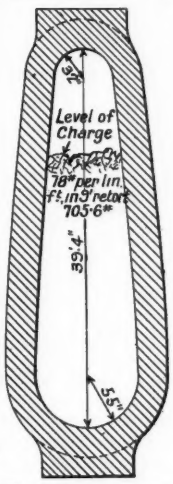


Fig. 4.—Oppermann's Elliptical Retort.

In order to avoid, to some extent, the foregoing difficulties, it has been proposed to use an elliptical retort, set with its major axis vertical (see fig. 4). This would give a small free space per unit of charge, a large area of contact of the coal with the retort sides, and great structural strength.

Summarizing the conditions that theory would indicate and those found by practice, we have almost exactly opposed conditions. From operating necessity, the size of the retort is pretty well fixed, while the economic demands of gas made per dollar expended in fixed charges require a high make per mouthpiece. This fixes a short, heavy charge at a high heat. Thus we find theory demanding a light, thin charge, not more than (say) from 2 to 3 inches thick, worked off in from 2 to 2½ hours, at a moderate temperature in a broad flat ⏢ retort; while our best practical figures seem to be obtained by a charge of about 380 lbs. in a 16 in. by 28 in. retort, worked at high heat in four hours. There seems to be a certain equilibrium, however, between the size of the charge, the cross-section of the retort, the temperature employed, and the time of charge which gives the most efficient results.

These economic points are, however, so dependent upon local conditions of send-out and candle-power requirements, cost of labour and bench renewals, and market for residuals, that their general discussion is obviously of little value.

I feel it must be evident that, in any form of retort or charge having a free space, we can never expect, from the nature of the process, to obtain anything more than an economical mean between almost perfect carbonizing conditions at some period during the charge, and very inefficient conditions at the end—and probably also at the beginning. The value of uniformity of conditions has been strikingly shown in the operation of water-gas apparatus. May we not hope for as much improvement in a method that will, to a considerable degree, secure them in coal-gas work?

* M. Guéguen, *loc. cit.*

† M. Verdier, "Influence of the Physical Condition of Coal on the Quality of the Products of Carbonization." "JOURNAL," Vol. LXXVIII., p.340.

Recent Wills.—Mr. G. Kelson Stothert, the Deputy-Chairman of the Bristol Gas Company, whose death was recorded in the "JOURNAL" for the 13th ult., left property valued at £26,822 gross and £19,779 net. The late Mr. Charles William Davis, a Managing-Director of the Davis Gas-Stove Company, Limited, whose death was recorded in the "JOURNAL" for the 29th of September, left estate valued at £50,255 gross, with net personalty amounting to £14,764.

Manchester District Institution of Gas Engineers.—The 154th quarterly meeting of the Institution will be held next Saturday at Oldham—the home of the President, Mr. T. Duxbury. Members are invited to visit the Hollinwood and Higginshaw Gas-Works of the Oldham Corporation; and by permission of the Mayor, the meeting will be held in the Town Hall, where, also, the Association will be entertained at refreshments and luncheon by the Chairman and members of the Gas Committee. The party will assemble at the Town Hall at 11 o'clock. The business on the *agenda* includes a notice of motion for alteration of the rules to carry out a unanimous recommendation of the Committee that the ordinary general meeting of the Institution be held the last Saturday in October, instead of the last Saturday in November. A description by the President of the Oldham Gas-Works will be taken as read. The desirability of contributing to the Gas Institution Benevolent Fund is again being brought to the notice of the members. The Hollinwood works will be visited in the morning, and the Higginshaw works in the afternoon.

SCOTTISH JUNIOR GAS ASSOCIATION.

WESTERN DISTRICT.

Visit to the Coatbridge Gas-Works.

Last Saturday afternoon, the members of the Western District Division of the Scottish Junior Gas Association paid a visit to the works of the Coatbridge Gas Company. The party, which numbered upwards of a hundred, were received at the gate, in very inclement weather, by the Engineer and Manager (Mr. Thomas Wilson) and the Secretary of the Company (Mr. W. Johnston). Mr. Wilson and his son—Mr. W. Wilson, of Falkirk—conducted the party through the works; but the proceedings were carried through under great inconvenience on account of the incessant downpour of rain. Mr. Wilson explained that the illuminating power of gas they supplied was 20 candles; and they used small coal and dross, with a proportion of shale. The railway runs into the retort-house on the floor level; and the coal is for the most part shovelled by the stokers into bogies, each holding about 15 cwt., which are then wheeled direct to the retort-bench. There is large storage capacity for coal behind the rails, but under the same roof. There are two retort-benches, on end, containing settings of eight through retorts, at present divided and worked as singles, of which there are 96, the dimensions being 9 ft. 6 in. by 24 in. by 15 in. The charge is 2½ cwt., and the duration four hours. All the charging and discharging is done by hand. The average price paid per ton of coal is 8s. 5d.; and the return for coke is 11s. per ton. There are four atmospheric condensers, composed of 12-inch pipes. The tar-well is the tank of the first gasholder built on the works in 1843. The station-meter is of 80,000 cubic feet capacity, constructed by Messrs. James Milne and Son, Limited, of Edinburgh. Sulphate of ammonia is made in plant supplied by Messrs. R. & J. Dempster, Limited, consisting of two stills and two saturators. Lime is not used to drive off the fixed ammonia, which is allowed to pass away. The yield of sulphate is at the rate, with shale, of 34 lbs., and with small coal and dross not less than 27 lbs., per ton of coal; the liquor running about 3° Twaddel. There are three gas-holders—a Gadd and Mason spiral-guided one of 750,000 cubic feet capacity, and two with standards, each capable of holding 250,000 cubic feet.

The inspection of the works having been curtailed, on account of the weather, the visitors were glad to take shelter in the lamp-hall—a place where the street-lamps are painted and repaired in the summer time. There the Company entertained them at "high tea"—Bailie Ballantyne, one of the Directors, presiding.

During the subsequent proceedings, the Chairman expressed the pleasure the Directors had in receiving the Association.

Mr. WILSON read a statement, in the course of which he gave the following particulars in regard to

COATBRIDGE AND ITS GAS SUPPLY.

I desire to associate myself and the other officials of the Company with the welcome extended by the Chairman, on behalf of the Board, to the members of the Scottish Junior Gas Association, who have done us the honour to visit our works. Coatbridge, as a town, possesses no great attraction for the visitor with a weakness for sight-seeing, as there is little in its architecture of special note, except, perhaps, its municipal buildings, its Technical College, its numerous schools, both high and low grade, and its great variety of religious edifices of diverse denominations, besides its tall chimney stacks. To the student of commerce, however, there are few towns in Britain which afford so much material of educational interest.

There have been many visits from industrial organizations of all sorts to our famous smelting and malleable iron works, and the large tube and other manufacturing concerns in the district; but this is only the second occasion on which the gas-works have been favoured with such recognition, the first being that of the North British Association of Gas Managers on the completion of the new works. The wag who writes the "Notes by the Way" in one of our local newspapers, having heard of the visit, insinuated that the reason of it was, no doubt, to learn the why and wherefore as to how Coatbridge produced the cheapest gas. Well, be that as it may, I will say frankly that it is not my intention to give away too much. You have had ample opportunity of inspecting the works and plant by which the cheapest gas is produced, and of making mental comparisons with what you have observed and noted in other works, some of them much more extensive, and even more modern in details, than those you have seen to-day. I will therefore leave you very much to draw your own conclusions, and confine myself to giving a brief statement of the history and progress of the Coatbridge gas undertaking.

In the year 1843, a number of local gentlemen, principally manufacturers and merchants, formed a private Company with a small capital, and works were erected on a site which is now the centre of the town. These works were conducted profitably until the year 1876, when it was found that there was no further room for extensions to meet the rather mushroom growth of the district. The Company was then reconstituted, and having obtained a Special Act of Parliament, with further capital powers for £32,000, the present works were laid down on what I think is an ideal site. They were designed by the late Mr. Robert Mitchell, afterwards of Edinburgh, who was Engineer and Manager at Coatbridge at the time. In spite of the outcry which I am told was then loudly voiced as to the scheme being far in excess of future requirements, and consequently incapable of being made remunerative, I am of opinion that Mr. Mitchell and his Directors were to be congratulated on their far-sighted policy; for, though they made provision for so long a period as twenty years, the town continued to grow speedily, and the plant was found not too adequate for the demands made upon it.

When I had the pleasure of migrating in 1880 to the smoke-laden atmosphere of Coatbridge from the briny breezes of Saltcoats, it was as yet a township, and had not earned its full title of the "Iron Burgh." The number of consumers was 3780, and there are now close upon 10,000. The annual production of gas was 41 millions; and it is now 181 millions—or about 4½ times greater. The quantity of coal carbonized was then 5000 tons per annum, and it is now 22,000 tons. There were a round dozen of street-lamps, which acted as an ornamental set-off to the Whitelaw Memorial Fountain at the Cross, being little needed for street illumination, owing to the abundant light shed by the wasteful system of smelting then in vogue. Now that Coatbridge has become a burgh—and I may add the eighth in importance in Scotland—and smelting ironmasters have, greatly to their profit, inaugurated a complete system of bye-products recovery (would that the malleable ironmasters and tubemakers could do the same), the Town Council have found it necessary to light the streets and back courts. At first there was a tussle as to whether gas or electricity should become the permanent medium for this street lighting; but in a short time, and after some costly experiments, it was clearly and conclusively demonstrated that not only was gas the superior illuminant, but that it was infinitely cheaper than its opponent. There are now 1250 gas-lamps in use, and not a single electric lamp. The gas-lamps are of the self-intensifying and Kern incandescent patterns. While the court-lamps have still flat-flame burners, we hope to induce proprietors to have them changed, if the burgh does not obtain power to take them over and authorize the change as a whole. I should say that our streets are now as well lighted as any in Scotland; and by continuing experiments with inverted burners, we may yet effect further improvement.

Regarding the prepayment system of supplying gas to consumers, I am proud to say that our Company were the pioneers in Scotland in this matter. We began to issue these meters when they came into the market in 1893, and we have now some 4000 in use. By these meters we reached a class of consumers who were solely users of oil. About the same time we commenced to give the hiring-out of cooking and heating apparatus our serious consideration, and there are now upwards of 4000 of these in use, at a capital cost of about £6000. We have not yet ventured on a meter-repairing branch, but we have a stove and gas-fire repairing workshop, where all kinds of apparatus can be overhauled and repaired at a considerable saving from the charges made by the makers.

All this expansion in the Company's business has not come about without the necessity for further additions to our manufacturing plant, with, of course, further capital powers granted under two Provisional Orders. As time proceeded, we began to feel a strain in overtaking the required output and in dealing with the purification. In 1896 we replaced a set of four 16 feet square purifiers with a similar number 24 feet square, at a cost of £2300; and again in 1900, as the other plant became fully taxed, the Directors embarked on a large scheme of alterations and extensions, including the doubling of our condensing plant, some new exhausters, new tar-extractor, new station meter, a new spiral-guided columnless gasholder of 750,000 cubic feet capacity, the remodelling of retort-benches (changing from a five to an eight setting), the substitution of a 24-inch for a 15-inch main, and increased railway siding facilities. The total cost of these alterations amounted to about £25,000. Last year we had to carry out a considerable scheme of enlarging and rearranging our mains for a distance of about 3 miles over all, at a cost of £2500; and this year we have had erected two retort-house governors with the necessary tar-seal and regulating valves, at a cost of £200. I may add that these outlays, large as they may appear, have been amply justified. Our output capacity has been increased to the safe quantity of 80,000 cubic feet per hour; and we can now store sufficient gas for about a day-and-a-half's consumption.

In passing, I may say that by adopting the Gadd and Mason columnless holder we not only effected a considerable saving in first cost, but we have a holder which, in the midst of the most severe storm tests, stood still as a rock, and is second to none of all other designs. I certainly would not return to a holder with standards or columns. We have also trebled the amount of coke available for sale by means of the new retort-settings, and have effected a considerable saving by the reduction of carbon deposit on the retorts through the adoption of retort-house governors. Four years ago, the advisability of introducing coal and coke handling plant was seriously considered by my Directors and myself; but you would notice that as yet our retort-house and yard are barren of any such structures, and that hand labour is still to the fore. The explanation of this somewhat alarming fact, judging from the pretty general adoption of such plant in gas-works of even smaller dimensions than ours, is that we have been cautiously waiting the evolution of the various types in what was thought by my Directors to be their experimental stage. The time has now arrived, however, when I think that coal and coke handling plant could be adopted with economy.

In conclusion, I may say that the fact that we are endeavouring to keep abreast of the times with our plant; that we use almost wholly small coal, including dross and nuts, and are able to sell from 9 cwt. to 10 cwt. of coke per ton of material used; that we purify solely with oxide and enrich with benzol; and, further, that we use every legitimate means of pushing the sale of gas for cooking, lighting, heating, and motive power, by displaying in a show-room, and even condescending to advertise in three local papers, the most recently improved and efficient burners and apparatus of all kinds—all this, together with the good fortune of having a Board of Directors composed of keen business men, willing at all times to assist in attaining any object in the interest of the Company, may to some extent account for the favourable position we occupy in selling gas at the cheap rate of 1s. 7d. per 1000 cubic feet for motive power, and 2s. for lighting purposes, and in paying the largest dividends in Scotland, even though labouring under a sliding-scale which prescribes that, for every 1d. of benefit the shareholder derives, the consumer has to get 5¾d. We have been going on steadily increasing by at least 10 per cent. in each year, until this last year of trade depression, when we find ourselves, for the first time in my experience, at a stationary point. But with better trade in view, and a prospective saving from the lowering of our illuminating standard, for which we are asking power at present, together with the continued practice of economy, we hope to go on flourishing, to the mutual advantage of our shareholders and consumers.

Mr. Alex. Wilson (Glasgow) proposed the toast of "The Coatbridge Gas Company." He said he was very glad to be present with the members of the Junior Gas Association. He usually liked to accompany them on at least one visit throughout the year; but there was perhaps another reason for his being with them there that day, which was that they were to visit the works where the cheapest gas in Scotland was being made. He had not yet passed the stage of learning; and he came to Coatbridge quite willing to be taught. Big as Glasgow was, they could not hold a candle to Coatbridge. Now that they were there, he thought the members should heartily thank the Directors of the Gas Company, Mr. Wilson, and his officials, for the treat they had given them. He did not consider they required to look very far for the reason of the success of the Company. Mr. Wilson had told them about the laying-out of the works long ago, and they had seen the works. He thought the foundation of the success of the Coatbridge Gas Company was laid when the works were put down. The Company must then have had a far-seeing engineer, and an equally far-seeing and capable body of Directors, who not only saw what was likely to be required, but who had the courage to carry out what they thought was the right thing to do. In laying out at that date gas-works of the size determined upon, they certainly required a good deal of courage. The members of the Association would, he thought, get a lesson that day in regard to the planning and carrying out of gas-works which they ought not to forget. The main thing, at the beginning, was to try to get a good-sized area of ground, so that they might have plenty of room to do their work, which they certainly had done in Coatbridge. Another thing there was that the works were very convenient for the railway system. The railway facilities appeared to him to be eminently suitable; and this seemed to add to the prosperity and cheapness of the works. Another thing to be observed at Coatbridge was that when the buildings were erected they must have been ample. The retort-house was large and airy; and this enabled the men to do their work with the minimum of labour and the maximum of comfort. The members had seen for themselves that in Coatbridge the money expended upon the gas-works had been well laid out; and they must all admit that the Gas Company had made the most of their opportunities. To have raised the output from 41 to 181 million cubic feet was very satisfactory; and he hoped this increase would go on.

The Chairman, in acknowledging the toast, said that the enlightened way in which their predecessors had designed and arranged the gas-works had made the work much easier for those who had followed. The Directors had endeavoured to carry on the good work which their predecessors inaugurated; and while they were, perhaps, behind some works of no greater capacity in the matter of machinery, still he believed they were doing as well, both for the shareholders and the consumers, as was being done in any works of a like size. There was no doubt that, when works came to a certain stage, machinery became most profitable; but he believed it had not yet reached its pinnacle. There was a view which sometimes struck him about machinery, which was that it was becoming a little too prominent. They had a great number of unemployed people. This matter of unemployment touched the question of machinery; because, what was the use of getting machinery to do work, and putting men outside the works' gate, when they were immediately called upon to keep those men? This was a phase of the machinery question which was worth considering. At any rate, it showed that there was another side to the question, and that, under present social conditions, machinery might not be altogether a benefit. He then proposed the toast of "The Junior Gas Association;" saying he believed that it now did a great deal of good, and would in the future do more. The gentlemen round him—at least a number of them—would doubtless be the leading engineers in the next generation; and possibly some of them would look back, when they had charge of a Granton or a Provan establishment, to the visit they had paid to Coatbridge. There was no industry which lent itself more to association than did that of gas manufacture. They were not competitors in trade, selling in the same market; for each had a market of his own, and therefore they could be very helpful to one another without doing harm to themselves. It was different in many branches of trade, because when somebody discovered something it paid him to "keep it up his sleeve" as long as possible. When gas engineers associated together, and compared notes, they were certainly doing something to help on the industry with which they were connected.

The President (Mr. A. H. Whitelaw, of Glasgow), in acknowledging the toast, said the Junior Gas Association was a great success. When they began they had a very hearty send-off from their honorary members; and he believed that, had it not been for the moral support they received from them, the Association would not have been in the strong position in which it was to-day. But there were other reasons for the success of the Association; and, in his opinion, their ordinary members had a great deal to do with this; for the papers which had been read would hold their own with those contributed to the Senior Gas Associations. He believed he was expressing the feeling of them all when he said that they entertained feelings of the highest respect for those who had so kindly entertained them that afternoon. With this in his mind, he believed they would approve of his proposing the health of Mr. Wilson, the Engineer at Coatbridge.

The toast having been duly honoured,

Mr. Wilson returned thanks. He said he was sorry that, the weather having turned out so bad, he had omitted to show the visitors their carburettor. He might tell them, however, that to enrich their gas cost them a considerable amount; but they were applying for authority to reduce the illuminating power of their gas to 15 candles, and they were likely to get it. When they did, the consumer, as well as the shareholder, would certainly reap the benefit.

Bailie Orr proposed the health of the Secretary of the Company; and Mr. Johnston acknowledged the toast.

The Hon. Secretary (Mr. J. Braidwood) proposed "The Chairman," who responded.

In the course of the afternoon, a very entertaining programme of songs and recitations was given by members of the Association, assisted by local gentlemen.

The Projected Gas Exhibition in Chicago.

In previous issues of the "Journal"—for instance last week, p. 479—reference has been made to the joint exhibition of gas appliances which is to be held in the Armory, Chicago, in the week commencing on the 7th prox., by the American Gas Institute and the National Commercial Gas Association, in connection with the meeting of the latter body. Readers may remember the formation of the Association was suggested several years ago by the publication "Light." At that time, the members of the gas industry in the United States were not at once convinced as to the desirability of forming a strictly commercial gas association; but the rapidity of the growth of this body and the manner in which it has been generally received have materially changed the attitude of certain prominent gas men who at first questioned the desirability of the project. It has been found that an Association devoting its entire energy to the one purpose of increasing the sale of gas—to endeavouring to bring about the selling of millions of cubic feet where thousands are sold to-day—is most desirable. We learn from the Secretary of the Association (Mr. Lucius S. Bigelow) that the projected exhibition will far surpass anything of the kind witnessed in America for many years, though the exhibition held in New York about eighteen months ago, under the auspices of the Association, nearly approached it in magnitude. Mr. Bigelow, on behalf of the Association, extends, through our columns, a pressing invitation to attend the meeting and the exhibition to any members of the gas fraternity who may at the time be in America, or who may choose to make a special trip for the purpose. To any who may find it possible to be present, he suggests the desirability of advising him in advance, at his office, No. 265, Broadway, New York, so that their names may be enrolled on the "roster" which will be in an assistant's hands at the door of the Armory.

The New Mayor of Tynemouth: A Correction.—By a slip of the pen, Mr. William Hardie, the new Mayor of Tynemouth, was described in the "Journal" last week as the Engineer and Manager of the Newcastle-upon-Tyne and Gateshead Gas Company. This position, as most of our readers are aware, is held by Mr. W. Doig Gibb; Mr. Hardie occupying a similar one in the Gas Company supplying the town of which he is now Chief Magistrate, as had been previously stated in the paragraph announcing his acceptance of the office.

Gas Lighting of Railway Carriages.—Notwithstanding the large number of systems of train lighting by electricity, the gas lighting of railway carriages continues to find favour with many railway engineers. According to a paragraph in the Engineering Supplement to "The Times," on the Victorian Government Railways during the past year, 40 carriages were equipped for Pintsch gas lighting, making the number 930, or 74 per cent. of the total. The use of incandescent mantles has also been extended with satisfactory results. On the broad-gauge lines of the South Australian Railways, 66 carriages have been fitted with incandescent mantles; and it is anticipated that all the 5 ft. 3 in. gauge carriages will be so equipped during the current financial year.

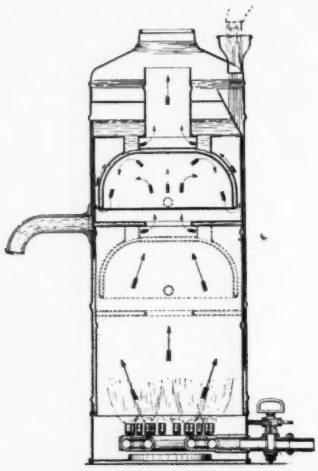
REGISTER OF PATENTS.

Gas Water-Heater or "Geyser."

FILDES, T. S., of Manchester.

No. 22,681; Oct. 15, 1907.

This heater (as shown) comprises inner and outer cylinders, producing a narrow water-way, and extending from the lower end to a point near the upper part. At its upper end the inner cylinder is closed, except for an outlet leading to a central flue or chimney. Within the inner cylinder, and near the top end, is a dished or dome-like fitment, formed hollow, and having a narrow water-way between its two faces.



Fildes' Gas-Geyser.

It opens, through tubular stays, into the space above the closed upper end of the inner cylinder, and also near its bottom edge into the space between the inner cylinder and the outer cylinder. In the annular space at one side of the geyser is a long division plate producing a flattened tube-like passage for conveying cold water to the bottom of the heater, and at its upper end terminating in a half-funnel. At the opposite side is a further plate, which rises to a point above the closed end of the inner cylinder, and produces a flattened tube-like passage for the outlet of the hot water—the lower end of the passage communicating with the draw-off cock of the heater. In the base of the heater are the usual burners. At a point immediately below the dome-shaped fitment, and extending from the inner cylinder, is an annular hollow projection, which extends below the edges of it and baffles the heated products of combustion as they tend to escape to the outlet flue or chimney.

Heating Water by Means of Gas.

SWEET, A., of Whetstone, N.

No. 22,930; Oct. 17, 1907.

This heater is constructed of a single run of helical or bent tube as described in patent No. 2180 of 1878, with the difference in construction that the patentee relinquishes the direct or bottom heat and relies for effectual heating results upon the diffused products of combustion alone—there being no direct impingement of the gas-flame upon the tube forming the heater. The improved boiler is made of two close-wound parallel sets of helical bent tube of different diameters; the smaller diameter set being of greater internal diameter than the exterior of the circular heat generator or burner, which is so placed that when in action it is central to the smaller diameter coil. By this arrangement, condensation cannot fall upon the burner.

Producing Inflammable Gas.

SCULTHORPE, J., of Liverpool.

No. 25,279; Nov. 14, 1907.

The object of this invention is to produce an inflammable gas of which the constituents are largely afforded by the decomposition of water in the presence of a vaporized hydrocarbon; the resulting gases being burnt together on issuing from a metallic chamber or vaporizer, into which latter the water and hydrocarbon are led or injected from a reservoir.

An unsaturated hydrocarbon is employed; and the patentee says that it has been found in practice that oleate of glyceryl (or oleine), when in a saponified condition, readily mixes with water and is then ready for vaporization. The water and saponified oleine are mixed in suitable proportions—as, for example, two parts of water to one part of saponified oleine—in the reservoir, and are conducted in their mixed or commingled condition to the vaporizer.

Instead of the oleate of glyceryl or oleine being employed in its saponified state, hydrocarbons which are rich in the oleate or oleine—such as certain varieties of fish oils—may be employed, it is said, with water in suitable proportions, and be separately injected or led into the vaporizer and be vaporized as stated. Or oleine may be added to petroleum or like oils, and such enriched oils are vaporized with the decomposition of water, as previously stated.

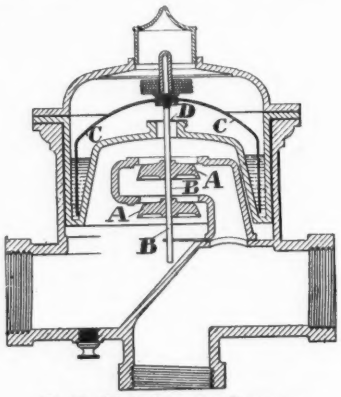
A special form of vaporizer is described, consisting of a cylindrical vessel containing an internal coned plate; the wider end of the cone closing the cylindrical vessel, and the axes of the cone and cylinder being coincident. The cone and cylinder are heated either by the combustion of the vapour generated therein or by other suitable means; the mixture of water and hydrocarbon being dropped or injected through an aperture in the cylinder, and falling upon the internal cone.

Gas-Governors.

STOTT, J., of Oldham.

No. 28,508; Dec. 27, 1907.

This governor (of the mercurial type) is intended to work with a high inlet pressure and a comparatively high outlet pressure.



Stott's High-Pressure Governor.

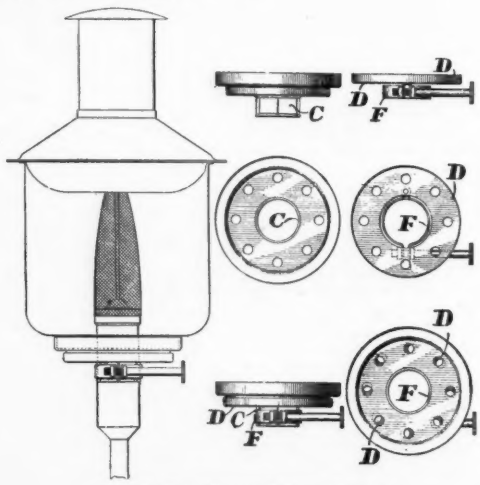
The extended depth of the trough shown causes the bell to keep sealed under any pressure of gas according to the depth or quantity of mercury used; and the deep cone-shaped valves A permit them to remain well in the area of control at the valve seating, when a comparatively high outlet pressure is required. Shallow or mushroom type valves, under similar conditions, would be soon out of the control area, and thereby materially lose their regulating properties; while a shallow trough, with its small quantity of mercury, would allow the gas to escape under high pressures. By means of the short valve spindle B, it is possible to confine the regulating weights to a position immediately above, or on, the dome or float C, and thus preserve a low centre of gravity and reduce the tendency to vibrate or oscillate, due to the action of the gas on the valves, which would occur with a long spindle. To prevent this possibility of the valve spindle vibrating or oscillating, there is placed in the neck of the trough (preferably on the top) a guide or guard D. In a lower position, this guide would be useless, and "it could only be placed higher by sacrificing the governor's controlling power, since the spindle would have to be lengthened and the weights put at a higher level."

Incandescent Gas Street-Lamps.

GLOVER, T., of Queen Victoria Street, E.C.

No. 2606; Feb. 5, 1908.

This improvement connected with street-lamps and the like for incandescent gas lighting consists in constructing the gallery base with perforations, and with a depending slitted sleeve or arms for encircling the burner-tube or gas-pipe, as shown.



Glover's Incandescent Lamp Burner.

The burner-gallery is made with series of holes or perforations in its base; and depending from the base is a slitted sleeve C, or a series of arms which encircle the burner-tube or gas-pipe and normally grip it. Below the base of the gallery is a ring disc D, having holes or perforations corresponding to those in the gallery, and depending from it is a band F (having its ends turned at right angles) encircling the slitted sleeve of the gallery. In one or both of the right-angled extensions of the band holes are formed, one or both being screw threaded; and through these holes is passed a thumb-screw, so that when the gallery

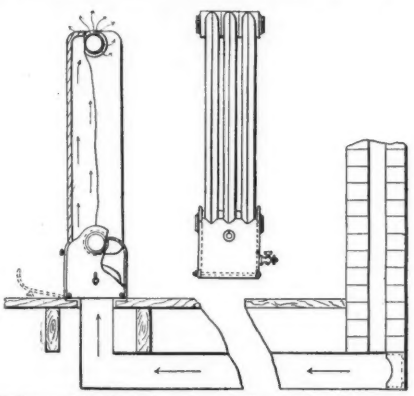
and the air-valve are placed in proper position on the burner-tube or gas-pipe to hold the globe or chimney in its proper position and regulate the supply of air, the thumb-screw can be tightened on the slitted sleeve of the gallery so as to hold it firmly to the burner-tube.

Gas-Heated Ventilating Radiators.

HADEN, W. N. & C. I., and WATTS, C. J., of Trowbridge.

No. 8004; April 10, 1908.

This invention relates to gas-heated radiators provided with means whereby a constant supply of heated fresh air can be supplied to buildings, &c.; the air used for combustion and for ventilating purposes being drawn through the intake from some exterior source.



Haden and Watts' Gas-Heated Ventilating Radiators.

As illustrated, the radiator has three hollow sections mounted on supports joined together at their higher and lower ends; the outside sections being provided with perforated plugs. A hinged door on each side of the radiator base fits against the lower supports, and the serrated higher edge encloses the bottom of the radiator.

The radiator is placed over a fresh-air intake connected to an air-grating in the outside wall. Air, on entering, passes through the intake and supplies the burner with the necessary air for combustion, and, being unable to escape at the base of the radiator, is heated by the flames and contact with the heated sections, and, passing through them, escapes through the top perforated plugs into the apartment in which the radiator is arranged.

The patentees particularly wish that their invention should not be confused with the class of gas-heating radiator which draws air in from an exterior source and passes it through pipes or other passages out again to the exterior air, and in which radiators the heating of the apartment or other place where they are arranged is effected by radiation from the exterior surfaces of the radiators and pipe.

Manufacture of Filaments for Illuminating Purposes.

MICHAUD, G., and DELASSON, E., of Montreuil (Seine), France.

No. 8104; April 11, 1908.

This is a "patent of addition" to patent No. 4451 of 1908—relating to "the composition of, and the means for manufacturing, fused refractory filaments applicable for illuminating or heating purposes by means of gas or electricity in the atmosphere." The present application relates to some modifications in the proportions of the primary material constituting the radiant portion of the filaments; and it also "indicates improvements in the method of treating the filaments and, consequently, also in the means previously employed for performing this operation."

The novel arrangement relates more particularly to the preparation of electric incandescent filaments in a vertical device allowing the interposing between the nozzles which form the filament and the electric furnace of a group of oxyhydrogen blow-pipes, the converging flames of which initiate the fusion of the filament, after which it passes into a tube or muffle of carborundum forming part of an electric furnace, in which it is subjected to pasty fusion, which "refines the materials perfectly."

Controlling the Supply of Gas.

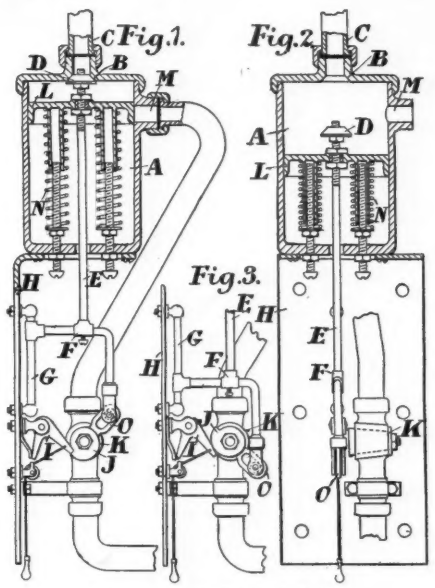
KOUMEAS, J. P., of Coney Island, Brooklyn, U.S.A.

No. 11,138; May 22, 1908.

This invention relates to a device for automatically cutting off the flow of gas when the pressure has dropped to a predetermined value, and to retain the cut-off until the device has been manually reset to permit the gas to flow again.

An embodiment of the invention is shown in the accompanying illustration. Fig. 1 is a side elevation (partly in section) showing the device in the cut-off position. Fig. 2 is a front elevation (partly in section) with the valve, piston, and cock in the open position, and—to facilitate a better showing—with the outlet port revolved 90° from its position as in fig. 1. Fig. 3 is a side elevation of the lower part, showing the position of the mechanism for operating the rock corresponding to the open position of the device.

The cylinder A has in the centre of its head an externally-threaded hub or boss, provided with an inlet orifice in which is formed a valve-seat B. An inlet pipe C (with coupling) is screwed to the orifice, and is either connected direct to the meter or to any part of the piping system. Seated in the inlet orifice is a valve D, secured upon the end of a rod E, threaded for a considerable part of its length and with a bushing screwed thereon. The rod extends through a hole in the bottom of the cylinder. The end of the rod is screwed in a T-shaped coupling F mounted on a horizontal bar, which, in turn, is screwed into a sleeve slidably mounted upon a vertical rod secured top and bottom by brackets bolted to the main bracket H—a bracket, preferably of steel, bent at right angles at the top to afford a support upon which the cylinder A rests. Screws are provided for securing the cylinder to this bracket.



Koumea's Gas-Supply Controller.

A bell-crank shaped pawl I is mounted on a bracket bolted to the main bracket H, and positioned so as to permit one arm to co-operate with the ratchet J to lock the cock K in the closed position when the gas supply has been cut off from the cylinder A. The pawl is retained in engagement with the ratchet by a spring secured at one end and having its other end pressed against the vertical end of the pawl. To release the pawl from engagement with the ratchet, a cord is provided with its upper end secured to the other arm of the pawl and its lower end passed around a pulley secured to the bracket H, and by which, when pulled down, the pawl is freed from the ratchet J, leaving the device to be set in the open position, which is done by manually forcing the piston-rod downward, whereupon the pressure of gas acts upon the piston L to maintain the device in an open position.

The operation of the device is as follows: The piston L is adjusted so that it will just cover (or be a little above) the outlet port M when the valve D is well in its seat. The lock nuts and adjusting screws are turned in the desired direction until the springs N exert a pressure upwardly upon the piston sufficient to overcome the desired pressure, as previously determined, and keep the valve well in its seat and the piston correspondingly covering the port M, in which position the other parts of the device should be so proportioned that the turn-key O will have risen to a sufficient amount to have closed the cock K and the ratchet be in proper position to engage the pawl I to lock the entire device in the closed position. The parts should also be so proportioned that, when the pawl is drawn free from engagement with the ratchet and the valve D lowered, the piston L will be lowered a sufficient amount to open the port M, and the turn-key O forced downward through an arc sufficient to open the cock. When the adjusting screws have been properly set, the lock-nuts are screwed tight, and the gas is then turned on to full pressure, the pawl I pulled down, and the piston-rod drawn down to open the device.

Sack-Holder.

DUNN, M., of Stockton-on-Tees.

No. 12,213; June 5, 1908.

This invention was referred to in the "JOURNAL" for Sept. 22, p. 780. It consists of apparatus in which a ring or open frame for supporting a sack with its mouth open is itself supported from a rod or bar which fits like a plunger or piston into a vertical standard mounted, by preference, on a portable platform, so that a lever fulcrummed to the vertical standard, with bifurcating arms extending beneath the sack-ring, can be used for lifting or lowering the sack and its contents with such jerking effect as may be desired. The several parts are arranged and operate together, as already described and illustrated in our pages.

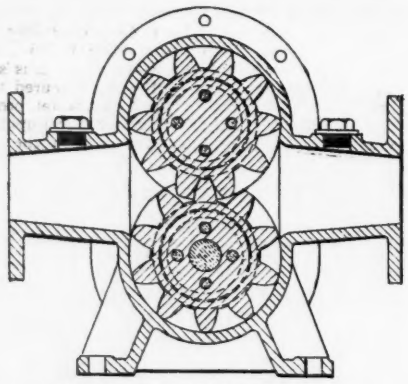
Rotary Pumps.

HODGSON, H. M., of Herne Hill, S.E., and the BRYAN DONKIN COMPANY, LIMITED, of Chesterfield.

No. 16,098; July 29, 1908.

This invention relates to rotary pumps of the geared-wheel type, and has for its object "to secure greater efficiency than hitherto possible, more especially when acting against high pressures."

As shown, each wheel of the pump is constituted of two parts bolted together and provided with helical teeth oppositely inclined, so as to eliminate end-thrust. Each wheel part is formed with a cylindrical recess to receive a boss or bearing upon the corresponding end plate of the pump; the annular extremity of the wheel part extending into



Hodgson and Donkin's Rotary Pump.

an annular recess in the region of the boss of the end plate. There is a packing or spring ring located in a groove on the exterior peripheral surface of the wheel extremity, and bearing against the adjacent surface of the corresponding end-plate recess. The engagement of the surfaces may be due to the elasticity of the packing ring, or to that of springs arranged to expand the ring.

APPLICATIONS FOR LETTERS PATENT.

23,923.—Cruickshank, A., "Mantles." Nov. 9.
23,961.—Lucas, O. D., "Pressure-governors." Nov. 9.
23,962.—Lucas, O. D., "Injector burners." Nov. 9.
23,992.—Knappich, J., "Making coal gas more suitable and economical for welding purposes, by increasing its calorific value." Nov. 9.
24,020.—Trant, W. H., "Temperature indicating apparatus." Nov. 10.
24,040.—Ware, J. J. & J., "Treating coal tar for use as auxiliary fuel in conjunction with coal or coke in retort chambers." Nov. 10.
24,109.—Lake, H. W., "Manufacture of gas from liquid hydrocarbons." A communication from the Hydrocarbon Converter Company. Nov. 10.
24,142.—Bower, G., and Leary, W., "Water pressure reducing apparatus." Nov. 10.
24,154.—Trenow, E. H. R., "Producing gas from spirit or oil." Nov. 11.
24,246.—Anderson, D., "Controlling devices for lighting systems." Nov. 11.
24,268.—Bradnock, J., "Fuel for gas-fires." Nov. 12.
24,303.—Swann, E., "Mantles." Nov. 12.
24,325.—Albon, I., and Parker, W. R., "Making fire-bricks." Nov. 12.
24,332.—Thom, T. M., and Pryor, H., "Manufacture of gas." Nov. 12.
24,340.—Bland, C. W., "Gas-controlling devices." Nov. 12.
24,362.—Drayson, W. B. H., and J. Tylor and Sons, Ltd., "Liquid meters." Nov. 12.
24,385.—Gilbert, A. T., "Intermittently illuminated gas-lights for advertising." Nov. 13.
24,395.—Burnett, H., "Switches and valves for gas lighting." Nov. 13.
24,482.—Hipkiss, E., "Pressure and gas regulating gauges." Nov. 14.
24,483.—Grossmann, J., "Apparatus for desiccating and in general producing effects such as have hitherto been obtained by filtration or pressing." Nov. 14.
24,493.—Keith, J. & G., "Inverted incandescent lamps." Nov. 14.
24,508.—Mair, G. S, M'L., "Gas cooking apparatus." Nov. 14.
24,518.—Leech, W. B., "Gravity bucket conveyors." Nov. 14.
24,519.—Dennis, F. H., "Acetylene generators." Nov. 14.

Stokers' Wages at Oldham.—Once more the question of the wages paid to their gas stokers has come before the Oldham Gas Committee—recent concessions made not being considered sufficient by the men. Some days ago, a deputation of stokers appeared before the Committee asking for a further increase, in addition to a week's holiday with pay. It was pointed out that discontent was seething among the men. The Committee took up the position that the wages paid should have some sort of relation to those in other towns, though there was considerable variance between their comparative figures and those the deputation put forth. The question is to be again considered when further information is obtained.

A Trades Unionist and the Halifax Gas Committee.—There was a lively discussion over the forming of the Halifax Corporation Committees for the ensuing municipal year—chiefly owing to opposition to the election of Alderman Morley to the Gas Committee, on which he desired to serve again. After he had been rejected, Mr. Sowood urged that Alderman Morley had nevertheless the confidence of the Trades Unionists outside. This was shown by his occupying the position of President of the Trades Council. Mr. Clay mentioned, as the reason for the exclusion of the Alderman from the Gas Committee, that he was Secretary of the Gas Workers' Union. Alderman Morley agreed that he held this position. He said he had never, however, attempted to disguise it. His former presence on the Committee, he claimed, was useful in avoiding a strike at the gas-works that would have been more disastrous than that of sixteen years ago. Mr. Clay pointed out that speculative builders were not allowed on the Improvement Committee, and licensed victuallers were excluded from the Watch Committee; and it was on the same grounds that Alderman Morley, as a Trades Union official, was denied on the Gas Committee.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Comparing the Cost of Gas and Electricity.

Sir,—Thank you for your article in the current number of the "Journal," entitled "Work among Consumers." With regard to the table headed "How to Compare the Cost of Electric and Incandescent Gas Lighting," do you think that the enclosed arrangement simplifies the matter? The comparison is based on electricity at 6d. per unit, which is the price charged in Reading for private house lighting where the consumption does not exceed 1000 units during the half year. To consumers using more than 1000 units, the price is 4½d. If the cost of renewing mantles and glasswork in the one case were included, and that of the electric lamps in the other case, the comparison would be still more in favour of gas, as our charge for renewing mantles and chimneys only amounts to 1s. per burner per annum.

Reading, Nov. 19, 1908. Douglas H. Helps,
Engineer and Manager.

[Enclosure.]

HOW TO COMPARE THE COST OF ELECTRIC AND INCANDESCENT GAS LIGHTING,

Taking a Light of 64 Standard Candle Power for 600 Hours as a Basis.

Four 16-Candle Carbon Filament Lamps.	These lamps consume 4 to 5 watts of electricity per candle power per hour. Thus, taking the lower figure, 16 candles × 4 watts × 4 lamps = 256 watts per hour. 256 × 600 = 153,600 watts. As 1000 watts = 1 unit of electricity, the cost, at 6d. per unit, would amount to £3 16 10
Two 32-Candle Power "Osram" Metallic Filament Lamps.	Allowing the high efficiency of 1¼ watts per candle per hour, these lamps would use 64 × 1¼ = 80 watts per hour. 80 × 600 = 48,000 watts = 48 units, at 6d. per unit £1 4 0
One 64-Candle Power Incandescent Gas-Burner.	One 64-candle power ordinary incandescent gas-burner* would consume 4 cubic feet of gas per hour. 4 × 600 = 2400, at 2s. 7d. per 1000 cubic feet, the cost would amount to £0 6 2 *** This is nearly one-fourth cheaper than metallic filament lamps, and no less than twelve times cheaper than carbon filament lamps. * An inverted or a high-pressure gas-burner would give a much higher candle power for the same consumption of gas.

Dangers of Petrol—Recent Experiences.

Sir,—In reference to your paragraph on the dangers of petrol gas, I think you will admit that there is no danger in many of the plants upon the market.

You know the plumber who seeks a leak with a match. His counterpart is the fitter who cannot recognize an accurate mixture of air and petrol, and turns a tap "to get a better light." He does not know that a mixture of over 5 per cent. petrol is more deadly than a room charged with 5 per cent. of coal gas. Petrol plants are running satisfactorily, and for small lighting are excellent; but careless handling often leads to accidents, many of which go unrecorded. During the time of the Franco-British Exhibition, I saw a piece of stupidity on the part of a workman which might have been very serious.

Only a few weeks ago, I was asked to give an opinion upon the commercial value of one of the almost countless patented systems. The patentee had a carburettor made of wood. The petrol was poured in through a bore-hole. When the box was full, the hole was closed with the cork of a beer-bottle. The air was pumped in by means of a bicycle pump. Into the holder there was one pipe. When the holder was full, the gas travelled back through the same pipe to the burners. I altered the machine, and put in inlet and outlet pipes, control, &c., and fortunately put a clapper-valve on the inlet-pipe. I fixed a hot-air engine and Roots blower, completed my experiments, and had the engine and blower removed. The patentee, not satisfied, had an engine and blower put on again. He did not get a sufficiently good light it seems, and therefore turned on a tap; the result being that the holder, with 36 lbs. weight on top, went up, lifted the floor above, and smashed to atoms a number of arc lamps, &c. There was no personal injury, as no one happened to be in the basement at the time. The damage was considerable; but had the valve not been on the inlet-pipe, the flame would have travelled back to the carburettor, the building would have been wrecked, and probably people killed. There was enough petrol about to have "done the trick."

These two cases do not prove anything except that inexperienced people should no more be allowed to deal with petrol gas than they should be permitted to drive motor-cars or seek coal-gas leakages with lighted matches.

Nov. 20, 1908. J. W. B.

The Sale of Companies' Shares by Private Treaty.

SIR,—I wish to draw attention to an advertisement which appeared in "The Times" on the 10th inst. I enclose a copy of the advertisement, a copy of the letter which I have sent to the advertiser, and also copies of two letters received from him. I cannot send the letter which Mrs. Burstal originally wrote in answer to the advertisement, as I have no copy, but it was merely asking for particulars.

It will be noticed in the advertisement that the investment is stated to be "a sound investment yielding 7 per cent. yearly;" while in the letter of Nov. 16 Mr. Saphin states that "the Company has not yet paid any dividends." It will also be noticed that he gives as a reason for this that "the Company only received the Royal Assent to their Act of Parliament in 1906," and that "it takes some few years before a new water company commences to pay dividends"—thus suggesting that it is an absolutely new undertaking.

The facts of the case are that the Company, under the title of the Barton-on-Humber Water Company, obtained statutory powers to supply water in 1885. In 1892, my firm (Messrs. Stevenson and Burstal, 38, Parliament Street, S.W.) reported upon the works which were then approaching completion, and the undertaking generally, on behalf of a client. In 1897, the Company obtained a second Provisional Order; and in 1906 the Barton-on-Humber Water Company was dissolved and the North-East Lincolnshire Water Company was incorporated. It was a change of name, and the Act only gave further powers to the Company.

In these circumstances, I would suggest that the advertisement is not in accordance in any way with the facts of the case, and that the statement made by Mr. Saphin in his letter of Nov. 16, that "the Company only received Royal Assent to their Act of Parliament in 1906," though true in fact, is most misleading to would-be investors as to the age and standing of the Company.

I would finally say that the words underlined in the letter of Nov. 11 are as received, and have not been added by me.

11, *Lingfield Road, Wimbledon, S.W.*, E. K. BURSTAL, M.Inst.C.E.
Nov. 17, 1908.

[ENCLOSURES.]

Advertisement in "The Times," Nov. 10, 1908, p. 20, col. 2.

TO INVESTORS IN WATER SHARES.

A sound investment, yielding 7 per cent. yearly, increasing in value, can be secured upon exceptionally favourable terms.

Write "Water Shares," care of J. W. Vickers and Co., 5, Nicholas Lane, London, E.C.

18 and 19, Ironmonger Lane, London, E.C.
Nov. 11, 1908.

Re Advertisement 10 per cent. ordinary shares Parliamentary Water Company

Dear Sir,—I am in receipt of your letter of the 10th inst. The shares referred to are those of the North-East Lincolnshire Water Company, Incorporated by Special Act of Parliament. The Company supplies the important town of Barton-upon-Humber, which has a population of about 6000 inhabitants, and is situated on the River Humber opposite the city of Hull. A Bill is now being promoted, I understand, to connect the two towns by rail, which would, of course, result in the rapid development of this part of the Company's area of supply.

In 1906 the Company obtained parliamentary powers to supply an important new district, including Alford and Spilsby; and the new works for the supply of both these towns were officially opened this summer. As showing the steady progress of the Company's undertaking at Barton-upon-Humber, the following figures may be quoted:—

Water supplied for the year ending—

March 31, 1904, increase over 1902 equals 38 per cent.
" " 1906 " " 1904 " 46 "

The quantity of water supplied to the inhabitants has doubled in four years.

Now that the new works at Alford and Spilsby (where water has been urgently required for some time past) are open and water is being supplied, the 10 per cent. ordinary shares are likely to *yearly increase in value*, having regard to the *progressive* nature of this class of investment.

The number of shares for disposal is 150, of £10 each fully paid up. The price asked is £7 10s.; and a sum would be deposited in joint names, if necessary, by which interest at 7 per cent. would be guaranteed for three years.

I enclose you a copy of the "Lincolnshire Chronicle" and "Horncastle Gazette," containing an account of the opening of the Company's new works at Alford and Spilsby, which may be of interest to you.

I shall be glad to hear what sum you have for investment. The above amount can, of course, be divided.

I might mention that the Directors are all local gentlemen of standing.—I am, yours faithfully, (Signed) Edward C. Saphin.
J. Burstal, Esq.

11, Lingfield Road, Wimbledon.
Nov. 12, 1908.

Dear Sir,—My wife has handed me the reply you were good enough to send to her inquiry respecting the 10 per cent. water shares of the North-East Lincolnshire Water Company. I am not able to gather from your letter what the Company's position is at the present time—that is to say, there is no statement of accounts, so that I do not know what dividend the Company is paying nor what its capital commitments are, nor the amount of business carried on.

Before making an investment in the Company, I should require to see the published balance-sheets of the last two years.—Yours faithfully,
E. C. Saphin, Esq. (Signed) E. K. Burstal.

18 and 19, Ironmonger Lane, London, E.C.
Nov. 16, 1908.

Dear Sir,—I am in receipt of your letter of the 12th inst., and in reply thereto beg to state that the North-East Lincolnshire Water Company has not yet paid any dividends.

The Company only received Royal Assent to their Act of Parliament in 1906, since when they have been constructing the works for the supply of the towns of Alford and Spilsby. As you know, it takes some few years before a new water company commences to pay dividends. Once paid, however, they are of a progressive nature; and as the Company's area of supply is an important one, when developments are taking place, the shares are likely to increase in value every year. If you are disposed to make an *offer* for a parcel, I shall be pleased to submit same.—Yours faithfully,
E. K. Burstal, Esq. (Signed) Edwd. C. Saphin.

LEGAL INTELLIGENCE.

AMMANFORD COUNCIL AND THE GAS COMPANY.

Manager Fined for Obstruction.

At the Ammanford Police Court, last Saturday week (before Messrs. Gulston and Du Buisson), the Urban District Council summoned Mr. Hubert Russell, the Manager of the Amman Valley Gas Company, Limited, for unlawfully obstructing the free passage of Station Road, by cutting the road open, and refusing to close it up when required.

Mr. T. M. EVANS, Clerk to the Council, appeared in support of the summons; the defendant being represented by Mr. J. W. BISHOP.

Mr. EVANS, in opening the case, said the facts were simple, and at the same time it was a very serious offence, under section 149 of the Public Health Act, 1875. The last three clauses read that any person who, without the consent of an urban authority, displaced or took up any portion of a road, should be liable to a penalty not exceeding £5, and a penalty of 5s. for every square foot so taken up. As to the words in the summons "did unlawfully and wilfully obstruct," he contended that he was quite right, inasmuch as the defendant did obstruct the free passage of a certain highway by cutting it up, and refusing to fill or close it when required. He would prove that the road was cut up. Therefore there was obstruction; and actually there was no defence whatever. He proceeded to dwell upon the enormity of the case, which he described as "glaring."

Mr. DU BUISSON said he did not quite see where the section applied.

The CLERK eventually decided that the hearing could be taken under the Highway Act.

Mr. *David Thomas*, the Surveyor to the Council, stated that Station Road was a highway under the control of the Council. Acting on instructions, he visited the place on the 5th inst., and there saw defendant with three or four men tapping the mains. They were cutting up the road in order to do so. The rubbish was thrown out into the road, and was causing an obstruction. He asked Mr. Russell to reinstate the road; but he would not—stating that he was acting under instructions from his Company to proceed. Witness told defendant that he had no authority from the Council, and he was instructed to stop him. Defendant said he was in the service of the Company, and had to carry out his orders. He produced a telegram which defied the Council. The telegram was to the effect: "Take no notice, carry out Directors' instructions."

The CLERK said this was not material.

Witness (continuing) said that on the following day also he saw a man tapping the mains. He went to Station Road, accompanied by the Clerk of the Council, the Chairman (Mr. T. Fletcher), Vice-Chairman, and several members, and found that the defendant had cut across the road to a distance of 9 ft. 2 in. There was a trench made; and the rubbish was piled up on the road. It caused an obstruction. There was a space of 8 ft. 10 in. left clear in the roadway. He asked defendant to desist, and close up the trench; but he declined to do so. Witness put his own workmen on to close it; and stationed one of the Council's men there, as defendant intimated his intention to re-open the trench. About 3 o'clock in the afternoon, one of the roadmen came to witness and made a statement, in consequence of which he called the Clerk and, accompanied by others associated with the Council, they went again to Station Road, and saw defendant in the trench, which had been re-opened. He was requested to leave, but would not do so; and it was some little time before he came out. The rubbish was in the middle of the road again; the old trench having been re-opened a distance of 9 ft. 2 in. Defendant afforded no assistance in re-filling the trench.

Mr. EVANS pointed out that the act was deliberately done; and he had no hesitation whatever in saying that there was serious disturbance of the road.

In cross-examination by Mr. BISHOP, witness said he knew that Mr. Russell was the Manager of a Company who wished to supply Ammanford with gas. The trench was opened by defendant's workmen; and the rubbish was heaped up. The depth of the trench would be about 2 ft. 6 in. Witness saw workmen cutting the trench; and they put the rubbish back on the first occasion. A Council workman was put to watch because defendant said he would re-open the trench, and would put a gang of forty men on, if he could get them. Witness considered defendant was a tool in the hands of his employers.

Re-examined by Mr. EVANS: When witness visited Station Road on the 6th inst., he found defendant in the trench, controlling operations himself.

By the BENCH: The workmen were causing the obstruction by the direction of defendant.

The CLERK said he took it that the defendant accepted responsibility.

Mr. BISHOP replied that that was not so.

Mr. EVANS was about to call the Chairman of the Council as a witness,

The CHAIRMAN, however, said the Bench found that there had been obstruction.

Mr. BISHOP did not deny the road was blocked up; and he therefore admitted the obstruction. But he contended that they had been wrongly sued.

The CLERK: In what way? The Bench have found a *primâ facie* case.

Mr. BISHOP said the workmen made the disturbance of the road. It had not been done by defendant, who had not himself obstructed the highway. The other workmen of the Company should have been summoned. Mr. Russell was nobody, and should not have been proceeded against.

The CHAIRMAN: We are of opinion that Mr. Russell has made himself liable.

Mr. BISHOP said that the proper person to proceed against must be the one who actually did the work.

The CLERK remarked that this would not do any good.

Mr. BISHOP then addressed the Bench in mitigation of penalty. Passing over the proceedings leading up to the case, he said they first of all were made to believe it was taken under the Public Health Act; but now it was heard under the provisions of the Highway Act, which contemplated actions of this kind. He wanted the Bench to understand, as they might gather from the evidence, that defendant acted as servant of the Amman Valley Gas Company, and had been told to go on with the work. The Directors of the Company had ordered him to proceed; and were the Magistrates going to punish a man severely for obeying his instructions? Remarking upon what had been detailed in evidence, Mr. Bishop said the trench had been filled up on the morning of the 6th inst., and defendant then wired to his employers, and was told in reply to open it again. There was no "enormity" in the offence at all. Russell was in the employ of the Company, who authorized him to go on with the work after the Council official had been down. He asked that defendant be let off on payment of costs. The passage of the road was interfered with for about an hour on one day, and for two hours on another occasion.

The Magistrates found that the offence had been committed. There would be a fine of 5s.

Mr. EVANS asked for an advocate's fee, which was granted.

Mr. BISHOP said defendant would have to pay the penalty himself.

The CLERK expressed the opinion that if defendant was the servant of the Company, they were at his back.

Defendant was ordered to pay £2 12s. 6d. fine and costs inclusive.

UNFOUNDED CLAIM BY A WORKMAN.

At the Shoreditch County Court last Tuesday, before his Honour Judge Bray, application was made by Robert Burns, a labourer, for an award against the Gaslight and Coke Company, under the Workmen's Compensation Act, 1906.

Mr. J. A. Slater appeared on behalf of the applicant; Mr. Vaughan Williams represented the Company.

Burns was said to be employed with two men, at the Haggerston station of the Company, in removing coke from the basement of the retort-house; and his work was to carry it up to the retort floor in sacks filled by the other men. His allegation was that one of the full sacks was dropped upon his back so heavily that the muscles of the neck were badly bruised, rendering him unable to do work for many weeks. He consequently sustained loss, as his wages had averaged about 20s. a week. Applicant was called, and stated that he complained at the time of the sack being dumped upon his back; and he had to give up after having carried another four or five sacks. Next day his neck was terribly stiff, and subsequently he consulted a doctor, under whose care he was for some time. Dr. Bird, the medical man referred to, said he attended Burns, who complained of great tenderness of the muscles, and witness came to the conclusion that he had strained them. He did not see any sign of bruising; but he did not consider this remarkable, as the lifting of the sack on to the applicant's back in the way he described would be more likely to cause a strain than a bruise. Judging by the symptoms described, he did not think it was possible for Burns to continue his work; nor did he consider he was shamming. This was the case for the applicant.

On behalf of the Company, the two men who were working with the applicant were called, and said the sack of coke in question was put on his back in the usual way, and though, after he had taken it away and returned, he complained that they had hurt him, and repeated this after carrying four more sacks. He carried about fifteen in all without further complaint. Mr. Thompson, the foreman, said he saw Burns a day or two after the occurrence, and there did not appear to be anything the matter with him. He thought Burns was shamming. The yard foreman (Mr. G. Gatland) and the man who had to select the men from the number applying for work testified to seeing Burns on the Monday morning after the alleged accident to him looking "fit and well." Dr. Finucane said he had examined the applicant under instructions received from the Company, and he had grave doubts as to whether any accident had occurred. Dr. George Hastings, the Company's Consulting Physician, also conducted an examination, and failed to find any trace of injury, tenderness, or strained muscles. Asked by Mr. Slater if he considered Dr. Bird was telling an untruth, witness said he certainly did not. All he said was that Dr. Bird had depended upon what his patient told him, which was a lot of things he imagined.

Mr. Vaughan Williams said this was his case. He said he should like to ask his Honour's earnest attention to the fact that the Company had the greatest consideration for their employees, and did not contest a case unless they thought there were some special reasons for it. This was one of that kind. They did not desire to press the point unduly, but there was certainly the suggestion that the applicant was malingering, and could have worked if he had chosen to do so. His Honour said there seemed to be no doubt that Burns had had a strain, but not caused by the sack. He thought the applicant had not told the whole truth, and had imagined something. Mr. Vaughan Williams said this had been the difficulty all through. They had tried to offer Burns something that would not prejudice the other men; but all their offers had been rejected. His Honour said very often men of this class exaggerated. They started with a small thing, and ended by imagining it was a big one. He did not wish to upset the chances of the applicant getting work with the Company, so he would say no more than that he had been led to imagine things. There would be judgment for the Company, with costs.

Damage to Lamp-Posts by Motor Omnibuses.

In the King's Bench Division of the High Court of Justice last Thursday, Justices Bigham and Walton had before them an appeal by the Barnes Urban District Council from a decision of the Judge at the Wandsworth County Court, in which the right of drivers of motor omnibuses to knock down public lamp-posts was under consideration. Mr. Simon, K.C., who appeared for the Council, stated that the London General Omnibus Company's motors passing through Barnes had damaged 18 electric lamps. In respect of two of the accidents, action was taken by the Council against the Company, who pleaded that, the vehicles having been constructed and driven according to the police regulations, they were not responsible for the damage when no negligence could be shown. The County Court Judge had expressed the opinion that when once it was shown that a lamp-post was injured, there was a *primâ facie* case against the Company; but he was further of opinion that the omnibuses were being run under police regulations, and that this was an answer to the claim, as they were allowed to occupy any part of the road. Mr. Justice Bigham, in allowing the appeal, with costs, said there was evidence of negligence, in the destruction of property. It was for the defendants to rebut this, which they had not done; and the judgment ought to have been entered for the Council. Mr. H. Charles (for the Company) asked leave to appeal; observing that the matter was one of great importance to the Company. Mr. Justice Bigham: Why do you say it is a matter of importance? Do you wish to go on knocking lamp-posts down? Mr. Charles: No. We only want to prevent the authorities from placing lamps in a position of danger. His Lordship said the question before them was only one of fact, and the Court therefore could not allow the appeal.

A Gas Engineer's Bankruptcy.

The adjourned first meeting of the creditors concerned under the failure of Mr. Sidney J. H. Willey took place last Thursday before Mr. E. S. Grey, the Official Receiver. The Chairman, after dealing with the proofs of debt lodged, stated that the meeting had been adjourned from the 29th ult., in order that the debtor might endeavour to bring forward a proposal of composition under which the creditors would receive 7s. 6d. in the pound. He had not, however, lodged the proposal, and now found he was unable to make any offer to the meeting. The debtor had filed a statement of affairs showing that the total liabilities expected to rank against the estate for dividend reached £2032 5s. 7d., and the assets were estimated to produce £30 10s. 11d.—showing a deficiency of £2001. A private meeting of creditors, it was reported, had been held early in October when an offer of 6s. 8d. in the pound was made. This, however, the creditors declined to accept. The debtor attributed his failure to heavy rates of interest and expenses incurred in borrowing money in order to pay off other debts. After some discussion, it was decided to adjudicate the debtor bankrupt, and a Trustee was appointed to act with a Committee of Inspection.

A Set-Back for Electricity at Tooting.

At to-day's meeting of the London County Council, the Housing of the Working Classes Committee will report as to the lighting of certain cottages on the Totterdown Fields Estate, which they say have up to the present time been fitted up for electric light under an arrangement with the County of London Electric Supply Company. Difficulties have, however, arisen with regard to the method of fixing the wires for the electric light; and, after careful consideration, the Committee think it best to terminate the existing arrangement, and to enter into an agreement with the Mitcham and Wimbledon District Gaslight Company for the supply of gas for lighting purposes on the automatic prepayment system. The Company will provide all the necessary fittings and supply the gas at the same rate as is charged to other consumers using automatic meters. The Electric Light Company are prepared "to consent to the existing agreements for the supply of electricity to the cottages being cancelled, subject to the Council agreeing not to introduce, during the next ten years, any other system of lighting in the cottages already installed with electric light." This stipulation will not, however, prevent the tenants of the cottages from themselves arranging with the Gas Company for the supply of gas either for lighting or cooking purposes if they desire to do so. The Committee recommend—(*a*) That an agreement be entered into with the County of London Electric Supply Company cancelling and determining all existing agreements as to the lighting by electricity of cottages on the Totterdown Fields Estate, and providing that the Council will not for ten years introduce any other system of lighting in the cottages which have already been installed with electric light. (*b*) That an agreement be entered into with the Mitcham and Wimbledon District Gaslight Company for the lighting by gas of cottages on the estate not yet installed with electric light.

Gas Workers' Union and Wages.—The quarterly report of the National Union of Gas Workers and General Labourers contains the following remarks, among others, relating to the Lancashire district, by Mr. J. R. Clynes, M.P., the District Organizing Secretary: "In only a few cases during the quarter have we been able to obtain slight advances in wages, because in the time of trade depression it is most difficult to make any headway in improving the wages of our members. We have, however, prevented reductions in some instances, or greatly lessened the amount of reduction it was intended to impose—thereby proving the dual quality of Trade Union assistance. For when wages cannot be increased, Trade Unionism often prevents attempts to reduce them."

PARLIAMENTARY INTELLIGENCE.

THE LEGISLATIVE PROPOSALS OF THE GASLIGHT AND COKE COMPANY.

The West Ham Gas Company to be Absorbed.

So far as the notices in regard to the gas legislation for next session, some of which are epitomized below, have come to hand, the most important is that of the Gaslight and Coke Company, the principal portions of which are here given.

The Bill to be promoted will authorize the Company to acquire the undertaking of the West Ham Gas Company, upon such terms and conditions, and subject to such provisions with regard to the liabilities and obligations of the two Companies or either of them, as may be or may have been agreed between them, or as may be prescribed by the Act, or authorize the Companies to enter into and carry into effect agreements for such sale and transfer. The Bill will prescribe the consideration (whether in stocks, shares, or other securities of the promoting Company or in cash) to be paid by them to the West Ham Company for the sale and transfer, and make provisions with respect to the allocation of such consideration among the holders of stocks or shares of that Company, and, if thought fit, provide for the vesting in the holders of such stocks, shares, or securities of stocks, shares, or securities of the promoting Company, and require the holders to accept them in substitution, either wholly or in part, for those held by them. Provision will also be made with respect to the holders of debentures, debenture stock, mortgages, or other charges of the West Ham Company; and the promoters are to be empowered to redeem them, by the issue of those of their own Company, or by payment of such pecuniary consideration as may be specified or provided for in the Act. Authority is to be given to trustees, executors, and other persons acting in a fiduciary capacity, to accept and hold mortgages, debentures, debenture stock, stock, shares, and other securities of the Gaslight and Coke Company, in substitution for similar securities of the West Ham Company. It is proposed to extend and apply to the enlarged undertaking all or any of the provisions of the existing enactments of, or relating to, the Gaslight and Coke Company and to the West Ham Company respectively, or either of them, and to authorize the former to exercise and enjoy all or any of the powers, rights, privileges, and exemptions of the latter Company. Provision will be made with respect to the standard price to be charged for gas supplied within the existing limits of both Companies, and a uniform standard price will be prescribed in relation to the enlarged undertaking. Other provisions will relate to the illuminating power, purity, and pressure of the gas supplied, and the testing of such gas.

The Bill will provide for the transfer to the promoting Company of all or any of the officers and servants of the West Ham Company, and make provision with respect to the terms of their employment and the compensation and gratuities to the officers and servants of that Company who may be removed; also for the payment of compensation to the Directors and Auditors of the Company for loss of office.

The limits of supply of the promoting Company, after the sale and transfer of the undertaking of the West Ham Company, are to be prescribed and defined; and, if thought fit, the Bill will declare as included within such limits any area in which the Gaslight and Coke Company are now supplying gas, and, so far as may be necessary, define the powers of the Company with respect to the manufacture and storage of gas and residual products, and the lands on which these powers may be exercised.

It is proposed to reduce, pursuant to arrangements with the London County Council, the standard price of gas supplied by the promoting Company, as prescribed by existing Acts relating to them, and to make all such alterations in the provisions of these Acts with respect to the sliding-scale of price and dividend as may be necessary in consequence of such reduction. The mode of operation of the sliding-scale is to be altered by providing that increases or reductions in the dividend payable by the Company shall be regulated according to the price charged for gas in the half year in respect of which the dividend is payable, and all necessary consequential alterations will be made in the enactments relating to the sliding-scale and the declaration and payment of dividends.

The Bill will define, in the case of defective meters, the period during which the defect shall be deemed to have existed, and make provision for the payments or allowances to be made to, or by, the Company in respect of the supply of gas incorrectly registered.

An important provision will be one reducing the illuminating power of the Company's gas as prescribed by the existing Acts.

The Company will ask to be empowered to make regulations, or to confirm any regulations already made, with respect to the nomination of persons to transfer stock held by employees; and to confer powers in regard to the transfer and handing over of any such stock and any moneys left in the hands of the Company on account of shares of employees in the profits or otherwise.

The Company wish for authority to increase, or enable the shareholders to increase, the maximum amount payable in each year as the remuneration of the Directors, and to enable them to award additional remuneration to any of such Directors in special circumstances.

Provision will be made with respect to the supply of gas by means of automatic meters, and the mode of, and procedure for, the recovery of moneys payable in respect of such supply and the fittings let on hire in connection therewith.

Application will be made for authority to increase the capital and borrowing powers of the Company for the purposes of the intended Act, or to authorize them, for these purposes, to raise additional capital by the creation of new shares or stock, either with or without preference, priority, or guarantee in payment of interest or dividend or other special privileges, by borrowing on mortgage, by the creation and issue of debentures or debenture stock, or by any of these means; also, if the Company think fit, to raise the whole or any part of the new capital by the creation and issue of additional amounts of any existing stock or debenture stock of the Company ranking *pari passu* with such stock or debenture stock.

In the final paragraphs of the notice are indicated the various Acts which may be incorporated with, or made applicable or inapplicable to, the Act applied for.

Notice to the West Ham Company's Shareholders.

The Directors of the West Ham Company issued last Thursday a circular to the stockholders stating that notice of a Bill to be promoted next session by the Gaslight and Coke Company would be published next day, and they felt it right that the notice should not appear without a simultaneous explanation on their part. "It is intended," they said, "that the Bill in question shall (*inter alia*) provide for an amalgamation of the Gaslight and Coke Company and the West Ham Gas Company. A proposal for such an amalgamation was made to this Company by the Gaslight and Coke Company during the present autumn, which your Directors thought right to entertain, and which has since been receiving their most careful consideration. In the negotiations that have taken place, the strong position of this Company has enabled the Directors to obtain terms which they believe will prove thoroughly satisfactory to all classes of stockholders, and will also safeguard the interests of the consumers. A complete formal agreement for carrying the suggested amalgamation into effect is now being prepared in accordance with these negotiations, the terms of which will in due course be laid before the stockholders for their approval or otherwise. The Directors much regret that they have not been able to include the terms of the agreement in the present communication; but the shortness of time available before the necessary publication of the Gaslight and Coke Company's parliamentary notice has rendered this impossible."

NOTICES GIVEN FOR BILLS (SESSION 1909) RELATING TO GAS, ELECTRICITY, AND WATER SUPPLY.

The following are among the notices which have been given for Bills to be promoted next session in connection with the supply of gas and water.

Aldershot Gas and Water.—The Aldershot Gas and Water Company will apply for authority to change their name to the Aldershot Gas, Water, and District Lighting Company, or such other name as may be defined in the Bill; extend their limits of supply so as to include the parishes of Puttenham and Wanborough, in the rural district of Guildford, the parishes of Newnham and Nateley Scures, in the rural district of Basingstoke, and a number of parishes in the rural district of Hartley Wintney; and acquire by agreement, but not otherwise, the undertakings of the Hartley Wintney and Odiham Gas Companies. The Company will ask to be empowered to supply gas in the area common to them and to the York Town and Blackwater Gas Company, construct and maintain additional works, sell gas for power purposes, and produce, store, and supply electricity. They wish to be authorized to enter into arrangements with, and acquire the undertakings of companies and persons within their area for the supply of electricity, as well as to construct works for this purpose themselves, and supply electricity in bulk outside their area. In connection with the water undertaking, they will apply for a definition of their limits, and for power to construct additional works, consisting of a well and pumping-station, a line or lines of pipes, and a covered service reservoir, all in the parish and urban district of Aldershot; and provision will be made that no wells or similar works shall be sunk or made within three miles of the works to be authorized by the Act. The Company's capital is to be consolidated and converted; and more will be applied for. The other provisions of the Bill will relate to the issue of stock to consumers and employees, the adoption of a sliding-scale of price and dividend, the formation of a special purposes fund; the letting of apparatus on hire, the wiring of consumers' premises, &c. It is intended to ask for the repeal of the powers of the Ascot District Gas and Electricity Company in regard to the supply of gas within the parish of Ash.

Alliance and Dublin Gas.—Application will be made by the Alliance and Dublin Consumers' Gas Company for power to construct works, consisting of a conveyor or gantry and an overhead conveyor, truckway, or siding, adjacent to their existing works, and to erect works for the manufacture and storage of gas, &c., on certain lands in the parish of St. Mark. It is proposed to extend the limits of supply so as to include a number of places in the county of Dublin, consolidate and convert the capital, raise more money, and ask for the amendment or repeal of the provisions of the Company's Acts with respect to the illuminating power and quality of their gas and the testing thereof, and for authority to make other provisions; and, in particular, so far as may be found necessary or desirable for these purposes, or for any other of the purposes of the Act, to set aside or alter an award in arbitration dated Dec. 16, 1889, made in determination of certain differences between the Company and the Dublin Corporation. Provision will be made in the Bill that, in cases of unavoidable cause or accident, the Company are not to be liable to penalty for insufficiency of pressure or deficiency of illuminating power or purity of the gas supplied by them. They wish to be enabled to frame regulations with respect to the position, size, and material of pipes and fittings to be laid on consumers' premises, the position of meters in buildings, and the inspection of meters, pipes, and fittings; also to make special provisions in regard to the supply of gas to premises having a supply from any source other than the mains of the Company.

Amman Valley Gas.—The Amman Valley Gas Company, Limited, will seek to be dissolved and re-incorporated; the present undertaking to be invested in the new Company. In the Bill to be promoted, provision will be made for the regulation and conversion of the capital and the confirmation of the site of the existing gas-works; and authority will be sought to maintain and extend the works and purchase lands, to define the limits of supply, break up roads and streets, levy rates and charges, and supply gas in bulk beyond the limits.

The illuminating power of the gas will be prescribed, and provision made for testing it. Additional capital will be required.

Ammanford Gas.—Authority will be sought for the incorporation of a Company for the supply of gas within the urban district of Ammanford and parts of the rural district of Llandilofawr, in the county of Carmarthen, and for the purchase by them, by compulsion or agreement, of the undertaking of the Amman Valley Gas Company, Limited, on such terms as may be agreed upon or prescribed by the Act. Permission will be required to erect and maintain gas-works; and the usual powers granted to gas companies will be applied for. The Bill is to authorize the Company on the one hand, and the Ammanford Urban and Llandilofawr Rural District Councils, or any company, local authority, public body, or person, on the other, to enter into agreements with respect to the breaking up and reinstatement of roads and the supply of gas for public or other purposes.

Bungay Water.—Application will be made for authority for the incorporation of a Company to supply water in the parishes of Holy Trinity and St. Mary, Bungay, in the borough of Eye, in Suffolk, and in the parishes of Mendham, Ditchingham, and Redenhall-with-Harleston, in Norfolk. It is proposed to construct wells and pumping-stations and lay down lines of pipes in both counties. Powers will be sought to purchase lands, levy rates and charges, and make provisions for the protection of the works and the prevention of misuse and fouling of the water. The capital powers of the Company are to be defined.

Eastbourne Gas.—The Eastbourne Gas Company will apply for authority to extend their limits of supply so as to include the parish of Hailsham, and a number of parishes in the county of Sussex, and to acquire the undertaking of the Hailsham Gas Company. It is proposed to consolidate and convert the existing capital and raise more, and to create a special purposes fund. Further provisions will be made with regard to the supply of gas engines, stoves, fittings, &c.; the testing of the quality of gas; and its supply in bulk.

Frimley and Farnborough District Water.—The Frimley and Farnborough District Water Company intend to apply for an extension of their limits of supply, so as to include several parishes and places in the rural districts of Hartley Wintney and Basingstoke, and for authority to construct additional works, consisting of a well (already partially sunk) in the parish of Odiham, two lines of pipes in connection therewith, and a service reservoir in the parish of South Warnborough. In the Bill to be promoted, provisions will be included in regard to the works of Lord Calthorpe and the Hartley Wintney Rural District Council, the pressure of water, the supply of fittings, &c. Further capital will be applied for.

Gaslight and Coke Company.—The principal features of the Bill for which notice has been given by this Company will be found on the preceding page.

Harrogate Gas.—The Harrogate Gas Company notify their intention of applying for the definition of their limits, and for their extension so as to include certain townships, parishes, and places in the rural districts of Knaresborough, Pateley Bridge, and Wetherby, in the West Riding of York; also for the confirmation and user of their existing railway, and of the lands and easements acquired therefor. The Bill to be promoted will include provisions to sanction the purchase of land; the granting of allowances to disabled employees; the erection, in any place within the Company's limits, of independent plant for the generation, supply, and use of acetylene, gasolene, suction gas, or any other gas which can be conveniently generated; the selling or letting on hire of engines, generating appliances, stoves, fittings, &c., for the purposes of any such independent installation, and the extension thereto of the provisions of the Acts relating to the Company; and the relief of gas-engines, &c., from distress. The Company's Acts are to be amended with respect to the issue of capital by auction, declaration of dividends, charges for public lighting, and cost of communication pipes.

Heckmondwike and Liversedge Gas.—The Heckmondwike Gas Company intend to apply for authority to consolidate and convert their capital, extend their works, supply gas in bulk and for power purposes, and change their name. The Bill to be promoted will contain provisions incidental to the supply, quality, and testing of gas, the sale of fittings, the formation of reserve and insurance funds, &c. Permission will be sought to purchase certain mains and plant of the Mirfield Gas Company. The promotors will ask for discretionary powers to the Directors in regard to affording shareholders access to the list of shareholders, or supplying them with copies.

Heywood Corporation.—The Corporation of Heywood intend to promote a Bill which will include several provisions in regard to their gas undertaking. They will prescribe the charges to be made for gas supplied through prepayment meters, fix the standard quality of gas, and provide for its better testing. Any person having a separate supply of gas for power or other purposes is to be required to pay a minimum charge for it; and authority will be sought by the Corporation to impose other terms and conditions.

Leyland and Farington Gas.—Application will be made by the Leyland and Farington Gas Company for an extension of their limits of supply, so as to include the parishes of Eccleston and Heskin, in the county of Lancaster, and for authority to raise additional capital, create reserve and special purposes funds, and change the name of the Company. The Bill will contain provisions in regard to the quality of gas and the means and method of testing it; and it is proposed to ask for the amendment or repeal of sections 32 to 35 of the Leyland and Farington Gas Act, 1863, relating thereto. Other provisions will bear upon the regulation of pipes and fittings, the supply of gas in bulk and for power, and the price to be charged.

Lisburn Gas.—The Lisburn Gas Company, Limited, will seek to be dissolved and re-incorporated. Their Bill will provide for the regulation and management of the reconstructed undertaking, and confer general powers in regard to the maintenance and extension of the works, the supply of gas in Lisburn and district, and its sale in bulk beyond the limits. The capital is to be regulated, and more will be applied for.

Lisburn Urban District Council.—Application will be made by the Lisburn Urban District Council for authority to purchase, by compulsion or agreement, the undertaking of the Lisburn Gas Company, Limited; to maintain, improve, and extend the existing works; and to supply gas in the urban district of Lisburn. The Council will also apply for an extension of their water limits, so as to make them coterminous with the proposed gas limits, and include portions of the rural district of Lisburn, in the county of Antrim, and Hillsborough, in the county of Down. The Bill will contain provisions as to the levying of rates and charges for the supply of gas and water.

Littlehampton Gas.—The Littlehampton Gas Company will seek to be dissolved and re-incorporated. The capital is to be converted and regulated, and more will be applied for. The existing and proposed extended limits are to be defined in the Bill, as is also the illuminating power of the gas to be supplied therein. Among the general provisions is one to the effect that money placed in slot-meters is not to be deemed to have been paid until the Company have actually received it; and others relate to the creation of renewal, reserve, and insurance funds, and to pensions to officers and servants.

Mountain Ash Urban District Council.—The Urban District Council of Mountain Ash have given notice of their intention to promote a Bill which will contain provisions in regard to their gas and water undertakings. They wish to prescribe the charges to be made for gas supplied through prepayment meters, fix the standard quality of their gas, and provide for the better testing of it. They will ask for authority to require any person who has a separate service of gas for power or other purposes to pay a minimum charge for gas supplied by the Council, to impose other terms and conditions in connection with such supply, to require the use of anti-fluctuators for gas-engines, and to fix the period of error in defective meters. The water provisions of the Bill will enable the Council to lay pipes in private streets, and authorize entry into buildings to inspect fittings by any person duly appointed for the purpose. Additional borrowing powers will be required.

Prestatyn Urban District Council.—Authority will be sought by the Prestatyn Urban District Council to purchase by compulsion or agreement the undertaking of the Prestatyn Gas Company, and maintain and improve their works. Additional powers in regard to the supply of gas will be required. Provision will be made for the winding up and dissolution of the Company in the event of purchase being effected. It is proposed to amend the Prestatyn Water Act of 1901 and the Prestatyn Water Order of 1881 so as to secure to the District Council a larger and more regular supply of water from the Ffynnon Asaph spring. Additional borrowing powers will also be applied for.

Shrewsbury Corporation.—Authority will be sought by the Shrewsbury Corporation to construct a weir across the River Severn, in order to raise the level of the water above it for a distance of about five miles, and to enable them to appropriate and use the water. The Bill to be promoted will contain several provisions in regard to the supply of electricity; one being to the effect that any person who has a separate supply from any installation other than that of the Corporation may be called upon to pay a minimum charge for any supply he may require from the Corporation, who will ask for power to impose other terms and conditions in connection therewith.

South Lincolnshire Water.—Application will be made by the South Lincolnshire Water Company to extend the limits of supply defined by their Act of 1906 so as to include the parish of Pinchbeck, in the county of Lincoln, construct two wells and pumping-stations and a pipe-line in that parish, and purchase the undertaking of the South Lincolnshire (Fen) Water Company. Additional capital will be required.

South Staffordshire Water.—The South Staffordshire Water Company require authority to construct new works, consisting of two pumping-stations and two pipe-lines, maintain as part of their undertaking, and improve and enlarge, certain existing works in the counties of Stafford, Worcester, and Derby, and increase their capital. The Bill to be promoted will contain provisions to enable the Company to make bye-laws with respect to waste of water, make and supply fittings, and sell water in bulk.

Watford Urban District Council.—The Watford Urban District Council are going to apply for further powers in regard to their water undertaking. They wish to define the limits within which they may supply water, construct additional works, consisting of a well and pumping-station adjoining those now existing, a reservoir in the parish of Bushey, and two conduits or lines of pipes in connection therewith; and borrow more money for these and other purposes.

Worksop Water.—The Worksop Water Company will apply for parliamentary sanction for their existing works at Sunnyside, and for authority to construct and maintain others, consisting of a well or wells and a pumping-station, at Checker House, all in the parish of Worksop. Power will be required to pump and collect water on certain specified lands, to supply it in bulk or otherwise, and to raise additional capital.

York Town and Blackwater Gas (Electric Lighting, &c.).—Application will be made by the York Town and Blackwater Gas Company for an extension of their limits of supply, so as to include a further portion of the parish of Frimley, in the county of Surrey, so much of the parish of Yately, in the county of Southampton, as is not at present within their limits, and the parishes of Finchampstead and Wokingham Without, in the county of Berks. It is proposed to ask for the repeal of the provisions of the North Camp and Farnborough District Gas Order, 1877, and the Aldershot Gas and Water Act, 1901, authorizing the Aldershot Gas and Water Company to supply gas within the extended limits of supply to be defined by the Bill, and to change the name of the York Town Company to such other as may be determined. Authority will be asked to produce, store, and supply electricity throughout the parishes of Frimley, Hawley-with-Minley, Yately, Sandhurst, Crowthorne, Finchampstead, and Wokingham Without, and to construct the necessary works. The other provisions of the Bill will relate to the breaking up and interference with streets, roads, and railways; the laying down and erection of electric lines, posts, and apparatus, the exemption from liability to supply electricity in certain cases, and the sale of energy in bulk outside the area of supply. Additional capital and borrowing powers will be required. It is intended to ask for the repeal of the Camberley and District Electric Lighting Order, 1906.

MISCELLANEOUS NEWS.

CONTINENTAL UNION GAS COMPANY, LIMITED.

The report of the Directors, to be submitted to the ordinary general meeting of proprietors to be held on Tuesday, the 8th prox., states that the transfer of the Montargis station of the Company to the Union des Gaz (of which mention was made at the last meeting) has been completed, on terms which the Directors consider will prove advantageous to both Companies. The amount to the credit of the reserve fund has been raised from £40,000 to £50,000. At Messina, the increase, both in the number of consumers and in the quantity of gas sold, has been about 6 per cent. The Directors regret that, in consequence of the failure of the town of Messina to raise the loan mentioned in previous reports, they have been compelled to take legal proceedings for the recovery of the large amount due to the Company. During the year under review, the Union des Gaz has obtained a concession for the lighting of the commune of La Frette, and has renewed the concessions of Montesson and Carrières. It has also contracted to supply electricity at Louveciennes, where it already has a gas concession. The above communes adjoin Paris, and are supplied from the Nanterre works.

The private consumers of the Union des Gaz have increased by 14,655—making a total number of 243,849; and the public lamps have increased by 1373. The total quantity of gas sold shows an increase of about 4 per cent. over last year. The cost of coal has been higher than in the previous year; but this has been partly compensated by the better price obtained for coke. The length of mains has been increased by 78 miles, making a total of 1127 miles. The amount expended on capital account was £156,821, which includes the cost of land acquired for new offices at Milan, and land for a new works at Genoa.

The Union des Gaz, after providing for debenture interest and debenture redemption, has been able to maintain the dividend at the same rate as last year, and to carry forward £12,909 to the new account. The available net balance of the profit and loss account of the Continental Union Company is £76,426; and the Directors recommend a dividend for the year of 7 per cent. on the preference stock, less income-tax, and 6½ per cent. on the ordinary stock, free of income-tax, carrying forward £11,126 to the new account, as against £7845 last year.

ORIENTAL GAS COMPANY, LIMITED.

The Street Lighting Contract.

The Ordinary General Meeting of the Company was held last Wednesday, at the London Offices, Finsbury House, Blomfield Street, E.C.—Mr. R. HESKETH JONES in the chair.

The SECRETARY (Mr. H. J. Luff) read the notice convening the meeting; and it was then agreed to take as read the report and the statement of accounts.

The CHAIRMAN, in moving their adoption, said the first two paragraphs of the report referred to the accounts. He thought he might say they were so satisfactory and clear that "he who runs may read;" and that they needed little observation from him or from any of the proprietors present that day. Coal had been dearer, and more difficult to get; but, thanks to the improvements that had been made on the works since Mr. Watson became their Engineer and General Manager, the profits had not been seriously affected. Here he might make an observation respecting the difference between Indian and English gas coal. Indian coals did not produce anything like the same quantity of gas as English coals; and it must be remembered that they were using Indian coal exclusively, which met the views of the residents of the country. Therefore it was not fair to compare the working results of Calcutta with those of England. The Directors were confident that the quantity of gas sold per ton of coal carbonized could be improved; and to this end they had authorized their General Manager to proceed with the extension of their trunk mains, and at the same time to take care that the existing mains were maintained in good order. The rate of exchange continued below 16d. to the rupee. But this had been provided for; and they had still £877 towards meeting any further depreciation. The fourth paragraph of the report alluded to the continuance of their negotiations for a new public lighting contract. The proprietors would naturally expect him to give them what information he could on this matter; but as the negotiations were still pending, and by the next mail they had to send to Calcutta explanations and suggestions for the consideration of the Corporation, the proprietors would, he was sure, forgive him if he requested them to accept what he said without asking him to divulge the contents of the letter to be posted on Friday. In May, 1907, the Corporation of Calcutta advertised for tenders for lighting, by gas, oil, electricity, or other illuminant, about 300 miles of streets, covering an area of about 20 square miles, leaving the tenderers to propose their own plans for carrying out the project; the end in view being to considerably improve the lighting of the city. The tenders were to be for ten, fifteen, or twenty years from May 1, 1911. It would be noticed that the Corporation provided no specifications, but asked that parties tendering should propose their own plans. The Oriental Gas Company and two Electric Light Companies sent in tenders in accordance with the advertisement. The tender of one of these Companies was ruled to be out of order; and the competition rested between themselves and the Calcutta Electric Supply Corporation. On the tenders being published, the electricians amended their tender; but the city authorities, after some considerable delay, came to the conclusion that the Gas Company's offer was the more advantageous, and practically decided that gas was the best and cheapest illuminant. Meantime, he might inform the shareholders that both themselves and their competitors exhibited in the public streets of the city different modes of lighting, both for intensity and practical use; and he need hardly mention that their General Manager and his staff exerted themselves to the great satisfaction of the Board in showing the advantages of gas over electric lighting as regarded both lighting power and cost. After several weeks' delay, it was pointed out that the Corporation could not enter into a contract for such an amount without the issue of a specification of the work to be tendered for, and the result was that all that had been done during the first five months of the year was rendered null and void. The necessary specification was prepared; and the Company submitted a tender thereon on June 30. This tender had been the subject of suggested amendments by the Corporation; and ultimately its final consideration was postponed until the 10th of next month, in order to enable their General Manager to come to London and consult the Directors thereon. The General Manager had reported that the extension of the gas lighting outside the Corporation district—viz., in the Cossipore-Chitpore Municipality—had during the year been increased by nearly 300 new lamps. The Company had also entered into negotiations with other small municipalities for gas lighting; but the terms were not yet settled. The Company had extended the use of cooking-stoves, &c., with success. The use of gas was becoming more and more popular with the small consumers and shopkeepers; and the newer forms of indoor lamps were attracting attention, with the result that it was inducing the people to use gas instead of oil-lamps. The Company had new lamps in use now capable of giving up to 1200-candle power, and had fixed two of these at the Grand Opera House, recently opened. The Board trusted the time was not far distant when they would be able to announce a reduction in the price of gas to the private consumers. Each proprietor had received a very interesting description of the gas-works at Calcutta; and he took this opportunity to publicly thank Mr. Maurice Graham for permitting the "JOURNAL OF GAS LIGHTING" to republish his copyright article.

Mr. H. D. ELLIS seconded the motion, which was unanimously adopted.

Proposed by the CHAIRMAN, and seconded by Mr. ROBERT MILLER, a dividend of 8 per cent. (less income-tax) was declared, less the interim payment of 3½ per cent.

Mr. ELLIS, in moving the re-election of Mr. R. Hesketh Jones, remarked that it was unnecessary for him to dwell even one moment upon the many qualifications Mr. Jones possessed as a Director of the Company. He (Mr. Ellis) had sat with him on the Board for about sixteen years; and as he had worked with him, so he had seen and admired the skill with which he administered the duties of the office.

Mr. A. TENNENT EASTMAN seconded the motion, which was heartily adopted.

Mr. W. WILLIAMS proposed that Mr. Miller be re-elected a Director. Mr. Miller had the advantage over many of them in being intimately acquainted with Calcutta; and this knowledge was of great advantage in many questions that came before the Board.

Mr. EASTMAN seconded the motion; and it was unanimously agreed to.

The CHAIRMAN and Mr. MILLER having acknowledged the continued confidence of the shareholders,

The Auditors (Messrs. S. W. Savage and F. Seel) were re-appointed, on the motion of Mr. A. F. ESSE, seconded by Mr. T. W. FORMAN.

The CHAIRMAN moved a vote of thanks to the Manager, Assistant-Manager, and staff in India and London. They had, he said, the pleasure of the company at this meeting of their Manager (Mr. J. C. Watson). He could hardly say in his presence what he should do in his absence regarding the value the Board placed upon his services. It was the general opinion of himself (the Chairman) and his colleagues that they had in Mr. Watson the right man in the right place.

Mr. ELLIS, in seconding, heartily concurred in every word the Chairman had used, and congratulated the proprietors upon the staff they had got.

The motion was cordially passed.

Mr. WATSON, in responding, said, on his own behalf and that of his staff in India, he was very pleased to receive the thanks of the proprietors. The officers and staff in Calcutta did endeavour to study the wishes of the Board in every possible way. They had very clear directions from London; and with the greatest loyalty and pleasure they carried out the orders of the Board. He was delighted to be present at the meeting; and he should go back with encouragement to the staff and to himself to do the best in the Company's interests.

The SECRETARY, replying for himself and the London staff, observed that they tried to second the efforts of Mr. Watson; and he thought Mr. Watson was satisfied with what the London staff did for the staff in Calcutta.

Mr. W. C. ELLISON moved, and Captain DAVID PETERS seconded, a vote of thanks to the Chairman and Directors; and it was unanimously carried.

The CHAIRMAN, in his reply, said he was pleased that the views, opinions, and work of the Board led to such satisfactory results as it had been his pleasure to lay before the proprietors. In his remarks, it had been desirable that he should be somewhat reticent as to the lighting question in Calcutta. It was his duty to point out the exact position the Company were in; and he hoped what he had said would be sufficient without further explanation at present. He fully appreciated the kindness of the proprietors.

This concluded the proceedings.

PRESTWICH AND ITS GAS SUPPLY.

A Desire to Join Salford.

A recommendation has been adopted by the Prestwich Urban District Council that the Salford Corporation should be approached with a view to the inclusion in their forthcoming Bill of an application for power to extend their area of gas supply so as to include the district of the Prestwich Council. This suggestion was contained in the minutes of the Radcliffe Gas Sub-Committee—a Committee appointed to inquire into the question of obtaining the best and cheapest gas supply for the district.

In support of the recommendation, Mr. Chorlton called attention to the price for gas charged by the Radcliffe Gas Company, and the

quality, and said they felt unanimously that by going to Salford when they were bringing a Bill before Parliament, they might get rid of the Company. On the question of the charges for gas to private consumers, he found that the Radcliffe Company charged 3s. 2d. per 1000 cubic feet, and Salford 2s. 9d. There was, however, a further difference. Salford gave 4d. discount, and the Radcliffe Company 2d. discount. This left an advantage in favour of Salford of 7d. per 1000 cubic feet. The Surveyor had got out the figures for public lighting. In the part of the district which was in Salford, the cost of gas for the quarter was 6s. 2d. per lamp; while the price the Radcliffe Company charged was 8s. 4d. per lamp. There was a further point in regard to a difference in measurement. Salford charged at the rate of 3½ cubic feet per hour, and the Radcliffe Company at the rate of 4 cubic feet. In face of these facts, and knowing as they did the public dissatisfaction, it could not be wondered that they sought this opportunity of going to Salford; and he felt sure that Salford were considering their proposals most favourably. If the time was too short to enable them to include their proposals in the present Bill, it could not be long before such proposals were brought forward again; and if they were backed up by the members of the Council and the general body of ratepayers, there was no doubt that the "incubus" would be removed.

MUNICIPAL WORK IN OLDHAM.

Gas and Water Departments.

The new Mayor of Oldham (Alderman T. Bolton), in the course of his address to the Town Council after his election, made extensive reference to the work carried out by the Corporation.

Alluding to the Gas and Water Departments, he said that when these were taken over in 1853, the water-works consisted of two reservoirs at Strinesdale, having a capacity of 216 million gallons, and a drainage area of 660 acres. Under the powers granted by various Acts of Parliament, fourteen other reservoirs have been constructed, making a total capacity of 1976 million gallons, with a drainage area of 5480 acres. Practically the whole of the drainage area is either Corporation property or they have control of it, and no cultivation or grazing is allowed on any lands from which water may flow into the reservoirs. The purity of the water is therefore beyond question and ranks as one of the best in the country. Several efforts have been made to increase the storage capacity; but all of these would have involved a large outlay. The final efforts of the Committee, however, have resulted in making an agreement with Messrs. Platt Bros. and Co. for a supply from Butterworth Hall Colliery. This water is of excellent quality, as shown by analysis not only recently but in past years; and the cost to the Corporation would be considerably less than for any which has been acquired previously. Application will be made to Parliament next session for the requisite powers to complete the work. When these are obtained, the anxiety of the Committee with regard to providing a good and abundant supply of water for the increasing wants of the district will be considerably allayed. By utilizing the whole of the previously rejected water at Strinesdale and Brushes Clough, for the purpose of supply for trade and municipal requirements, the constantly increasing demand has been met without inconvenience being felt by the large population. The supply from this source at the present time is about 700,000 gallons per day, and will shortly be increased to nearly 1,000,000 gallons. The total capital expenditure on the water-works at the present time is £1,203,095. The whole of the works and the large additions to them have been made without costing the ratepayers a single penny in the form of rates; the expenses having been provided by the water-rents.

Like the water-works, said the Mayor, the Gas Department has never entailed any expense to the ratepayers. The works have always been self-supporting—better still, have been the means of assisting the rates out of the surplus profits to a very considerable extent, in addition to providing free gas for street lighting within the municipal borough since 1886. The growth of the undertaking is shown by comparing the quantity of gas made in 1854 with that made at the end of March last. The production in 1854 was 106,403,000 cubic feet, while that produced this year was 1,471,434,000 feet; and the prices have been reduced from 4s. 6d and 3s. 4d. per 1000 cubic feet in 1854 to 2s. 2d. and 1s. 9d. at the present time. Alterations and improvements have been constantly going on to keep pace with the increasing demand, with the object of cheapening production for the benefit of consumers. These additions have almost exhausted the borrowing powers obtained in 1886; and fresh powers will have to be sought in the next session of Parliament to enable the Committee to carry out further extensions, which will comprise a new gasholder and tank at Hollinwood, and other additions to plant at that station involving a total expenditure of £70,000. Additional gasholder accommodation will have to be put down at Higginshaw; and new mains and cooking-stoves will also have to be provided for. Altogether it will be necessary to borrow to the extent of £200,000 to carry the undertaking over the next ten years. As is now well known, the Gas Committee have been providing free cookers; and since the time the scheme was inaugurated in 1904 until the end of March last, the total number in use was 12,504. This must have a tendency towards creating less smoke, and a purer atmosphere. The total capital expenditure on the undertaking is £603,041; and there is money in hand to be applied to this purpose amounting to £126,490. Profits have also been utilized during past years for the extension of gas-works to the amount of £93,001.

The Potteries Federation Question.—To-day a Select Committee of the House of Lords, consisting of the Earl of Cromer (Chairman), Lord Colchester, Lord Monk Bretton, Lord Blyth, and Lord MacDonnell, will commence the consideration of the Local Government Provisional Order (No. 3) Bill, which is to confirm an Order made by the Board in relation to the boroughs of Burslem, Hanley, Longton, and Stoke-upon-Trent, and the urban districts of Fenton and Tunstall.

FATAL GAS EXPLOSION IN BROOKLYN.

Sewer Excavation Damages Mains.

According to telegraphic messages in the London papers last Saturday, fourteen persons were killed on the previous day as the result of a serious explosion of gas which took place in an excavation for a new sewer in Gold Street, Brooklyn. The accounts necessarily vary as to details; but it appears the excavation had been carried down about 40 feet, the sides being boarded up in the usual way, and the opening spanned by a temporary bridge to allow pedestrians to cross. About half way down ran a gas-main, and there was also a water-main. Owing possibly to the earth being inadequately shored up, the pavements gave way, and fell on to the men—about a dozen in number—working below, fracturing the gas-main in their descent. The escaping gas, coming in contact with a light, exploded; the effect of which was to disturb the whole street, dislodge more pavement, and carry down with it into the excavation a number of people who were passing at the time. Fire followed the explosion; and the falling *débris* fractured the water-main, the contents of which flooded the trench. Four of the men managed to save themselves by running to the nearest manhole. The others were, it seems, less fortunate; the flames from the gas making the work of rescue almost impossible. A woman and two children were pinned by a burning beam, which one of the workmen managed with great difficulty to raise while they were liberated; but he himself unhappily lost his life.

BRIDGEND'S CHEAP ELECTRICITY STATION.

An inquiry was held at Bridgend last week by Mr. H. S. Bidwell, on behalf of the Local Government Board, into an application by the Urban District Council for sanction to borrow £8250 in connection with the purchase of the electric power station, plant, and mains at Bridgend belonging to the South Wales Electrical Power Company.

In explanation of the proposal, the Clerk (Mr. T. J. Hughes) stated that in 1893 the Council obtained a Provisional Order under the Electric Lighting Acts. Nothing was, however, done under the Order until 1902, when the Council entered into an agreement with the South Wales Electrical Power Distribution Company (who had erected a large power station at Bridgend, at a capital cost of £38,000) to take electrical energy in bulk for public lighting. It was arranged that the Company, who were supplying the county asylums at Angelton and Parcgwyllt with current also, should add together the quantities of power consumed by the asylums and the town, and charge the Council and the Asylums Committee on the basis of that total, which meant a saving to both Authorities of something like 30 per cent. The Bridgend Council were charged 1½d. per unit and ⅛d. for transforming; and subsequently the charge per unit was reduced to 1⅜d. Two years ago the Company encountered difficulties. The station at Bridgend was being worked at a loss; and so that the place, which was supplying the current for public lighting, might not be closed, the Council agreed to subsidize the Company, and paid the monthly deficit on the working. The Council's proportion of the deficit last year was £380. The Company ultimately offered to sell to the Council the power station, plant, and mains for £14,000; and the Council offered £5000 for the concern, which was accepted. Before deciding to purchase the station, the Council concluded an agreement with the Asylums Committee that the asylums at Angelton and Parcgwyllt should take electrical energy for power and light exclusively from the Council's power station. The Committee agreed to pay 3d. per unit for lighting for the first period of seven years, and 2½d. for the second; and 1½d. per unit for power for the first seven years, and 1¼d. for the second. Last year the asylums consumed about 130,000 units, and the town 120,000 units. The balance of the loan asked for was to carry out certain improvements.

FATAL ACCIDENT AT BIRMINGHAM.

A Sad Occurrence at Windsor Street.

As the result of an accident at the Windsor Street Gas-Works of the Birmingham Corporation, a fitter, named Walter S. Gregory, lost his life on Monday afternoon last week. He was engaged with other men in work on the inlet-pipe of a holder, when he was overcome by gas, and fell into 4 or 5 feet of water in the bottom of the chamber in which he was engaged. Deceased and his companions were working on ladders; but his collapse was apparently so sudden and so unexpected that no one could save him—the man who was standing nearest to him being unable to make any effort in this direction, as he too came under the influence of the gas. In his case, fortunately, the effects were only of a temporary character; and when he was conducted to the fresh air, he soon recovered. Notwithstanding the presence of so much gas in the well, no time was lost in rescuing Gregory. By then, members of the ambulance brigade attached to the works were in attendance; and when the apparently lifeless body of Gregory was brought up, everything possible was done to restore animation. Oxygen was administered, and warm blankets were wrapped round him. These attempts at resuscitation were continued, under the direction of Mr. J. Foster, the Engineer in Charge, until the doctors who had been summoned reported that life was extinct.

The inquest was held on Wednesday; and at the outset of the proceedings Mr. Prideaux, on behalf of the Gas Committee, expressed their regret at the fatality and their sympathy with the relatives of the deceased, who was an excellent workman. Mr. Willison (instructed by the Gas-Workers' Society) appeared on behalf of the relatives. Mr. G. Hampton Barber, Secretary to the Gas Committee, also attended; and plans were submitted by Mr. Foster.

The head foreman, William C. Hortin, said that he gave Gregory instructions to take the steam-pipe out of the inlet-main, to see if it was fractured. It was not possible to turn the gas off while the steam

pipe was being taken out, though it was usual to shut off the valve on the works side, so that no fresh gas flowed in from the works. Notwithstanding this, there would be an outflow of gas from the pipes and the holder; and there was no valve between this point and the holder. Gregory had done this work several times before. Witness said, in cross-examination, that the danger would have been practically as great if the holder had had much less gas in it. He further explained that the greater the ventilation, the better chance the gas would have had of escaping; and possibly had he or some other foreman been superintending the work, more boards would have been removed. He did not know that there was any special reason for a foreman to be present. In reply to a question by the Coroner as to whether it would not be possible to devise something to stop the flow of gas in some other way than by merely blocking with waste or clay, witness said he could not think of any other practicable method. Deceased, as a very experienced man, would have freedom to run the job on his own lines.

Among other witnesses, Fred Prouse, a fitter, who was engaged on the job, described how, when he discovered that Gregory had fallen to the bottom of the well under the main, he sent for a rope and held him out of the water as far as he could. Another fitter, named Hospin, said he tied a rope round himself, went down the ladder, and recovered the body of Gregory, who had been about ten minutes in the water. Dr. Whitehouse stated that in his opinion the man was overcome by gas, fell into the water, and was drowned. Mr. Willison: It is possible that if there had been something to arrest his fall into the water—such as a platform—he might have been saved? Witness: Yes. Dr. Cochrane agreed with Dr. Whitehouse's conclusion, but with regard to Mr. Willison's suggestion said that it would really have been a question whether the man would have been alive or not. He might have died from the gas then.

The Coroner (Mr. Isaac Bradley), in summing up, said he hoped those responsible at the works would consider whether anything could be done to make such work safer. The Jury returned a verdict of "Accidental death," and agreed with the remark of the Coroner. Mr. Willison said he thought it was desirable that the brave action of the witnesses who went down one after another into the chamber should be mentioned. The Coroner remarked that all in Court were agreed that they acted in a very courageous manner.

MAIDSTONE ELECTRICITY UNDERTAKING.

Hire and Sale of Lamps and Appliances.

At the Monthly Meeting of the Maidstone Corporation, the Town Clerk (Mr. S. L. Monckton) read the following letter which he had received from Messrs. Hoar, Tatham, and Whitehead, who wrote on behalf of the Gas Company, with reference to the letting on hire and selling of electric lamps and appliances by the Corporation.

On behalf of our clients, the Maidstone Gas Company, we write to call your attention to the fact that the undertaking given by the Corporation under their common seal on Nov. 14, 1906, to Messrs. Hearnden and Stevens and other ratepayers, has been broken by the letting on hire and selling of electric lamps and appliances.

It is unnecessary to quote the terms of the undertaking; but I would remind you of assurances already twice given since that undertaking was sealed by the Corporation. Firstly, by your letter of Jan. 3, 1907, as follows: "My Committee had before them your letter of the 21st ult. at their meeting yesterday, and have instructed Mr. E. E. Hoadley [the Engineer] . . . to see that the undertaking given by the Council is strictly adhered to in every respect." Secondly, by your letter of March 12, 1907, in which you wrote: "My Corporation will not do anything to break their undertaking."

There can be no doubt whatever as to the manner in which the Electricity Committee or their Engineer have entirely ignored their undertaking; for we have before us the printed circular dated October, 1908, headed "Maidstone Corporation," and with Mr. Hoadley's name at the foot thereof, quoting prices for the hire of lamps and other incidental matters.

We must hold the Corporation responsible for a circular headed with their name and signed by their official; and we are therefore instructed to ask that you, as Town Clerk, will bring this letter formally before the Corporation at their next meeting, and will favour us with their explanation of the matter.

It was agreed that the letter should be referred to the Electricity Committee for a report.

FUEL ECONOMY AND SMOKE PREVENTION.

A number of engineers, medical officers of health, and representatives of British industries assembled on the premises of the London County Council, in Belvedere Road, Lambeth, last Wednesday, to witness a demonstration of the "Eclipse" boiler furnace and fuel economizer. It consists of a gas-producer, which delivers at the far end of the furnace and behind the coal-fire a volume of gas which, mixed with air conveyed by a second pipe, sets up further combustion, producing incandescence. The smoke from the fire in passing through this intensely hot flame is absolutely burnt up before it can reach the chimney-shaft. The invention, which is the work of Mr. Hope, calls for notice, as promising to mitigate the evils of the smoke nuisance; and it appeals also to manufacturers, for it is claimed that it effects a saving of 30 to 40 per cent. in the cost of fuel. Experiments which have been carried out under the personal superintendence of the National Boiler Insurance Company and of Mr. James Swinburne, F.R.S., who is President of the Junior Institution of Engineers and of the Association of Engineers-in-Charge, give the following results as to the cost of raising 1000 lbs. of steam: Two tests without the apparatus, and using best Welsh coal, 15d. and 15·1d.; three tests with the apparatus, and using bituminous slack, 9·58d., 10·6d., and 8·76d.—showing an average of 9·74d. with the economizer, with an increased output of steam.

At a luncheon which followed the demonstration, Mr. P. Nettlefold, who presided, expressed the opinion that, besides being welcome to

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 548.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
590,000	10	Oct. 15	10	**Alliance & Dublin** 10 p.c.	17⅞–18⅛	..	5 9 7
268,324	10	"	7	Do. 7 p.c.	12¼–12¾	..	5 5 8
310,000	Stk.	July 15	4	Do. 4 p.c. Deb.	100–102	..	3 18 5
200,000	5	Oct. 29	6½	**Bombay, Ltd.** . . .	5⅞–5⅞	..	5 10 8
40,000	5	"	6½	Do. New, £4 paid	3¾–4⅛	..	6 6 1
50,000	10	Aug. 27	14	**Bourne-mouth Gas and Water** 10 p.c.	29–30	..	4 13 4
51,810	10	"	7	Do. B 7 p.c.	16⅜–17	..	4 2 4
53,200	10	"	6	Do. Pref. 6 p.c.	15⅜–16½	..	3 13 10
380,000	Stk.	Aug. 13	12½	**Brentford Consolidated**	245–248	..	5 0 10
300,000	"	"	9½	Do. New . . .	187–190	..	5 0 0
50,000	"	"	5	Do. 5 p.c. Pref. .	122–124	..	4 0 8
206,250	"	June 12	4	Do. 4 p.c. Deb. .	102–104	..	3 16 11
220,000	Stk.	Sep. 11	10⅔	**Brighton & Hove Orig.**	207–210	..	5 2 4
246,320	"	"	7⅔	Do. A. Ord. Stk. .	152–155	..	5 0 0
450,000	20	Oct. 15	10	**British**	42⅛–43⅜	+⅛	4 11 11
109,000	Stk.	Aug. 27	6	**Bromley, Ord. 5 p.c.** .	114–116	+½	5 3 5
165,700	"	"	4½	Do. do. 3½ p.c. .	84–86	..	5 4 8
500,000	10	Oct. 15	7	**Buenos Ayres (New) Ltd.**	11–11⅛	..	6 1 9
250,000	Stk.	June 26	4	Do. 4 p.c. Deb. .	93–95	..	4 4 3
150,000	20	July 15	7½	**Cagliari, Ltd.**	25–26	..	5 11 6
100,000	10	—	—	**Cape Town & Dis., Ltd.**	4–5	..	—
100,000	10	Apl. 26	4½	Do. 4½ p.c Pref. .	5–6	..	7 10 0
50,000	50	Nov. 3	6	Do. 6 p.c. 1st Mort.	46–48	..	6 5 0
100,000	Stk.	June 26	4½	Do. 4½ p.c. Deb. Stk.	78–80	..	5 12 6
157,150	Stk.	Aug. 13	5	**Chester** 5 p.c. Ord. . .	108½–110½	..	4 12 7
1,493,280	Stk.	Aug. 27	5⅝	**Commercial** 4 p.c Stk. .	106–108	..	4 16 4
560,000	"	"	5	Do. 3½ p.c. do. .	103–105	..	4 15 3
475,000	"	June 26	3	Do. 3 p.c. Deb. Stk.	82–84	..	3 11 5
800,000	Stk.	June 12	6½	**Continental Union, Ltd.**	108–110	..	5 18 2
200,000	"	"	7	Do. 7 p.c. Pref.	139–141	..	4 19 3
460,170	Stk.	—	5	**Derby Con. Stk.** . . .	122–124	..	4 0 8
55,000	"	—	4	Do. Deb. Stk. . . .	103–105	..	3 16 2
148,995	"	Sep. 30	5	**East Hull** 5 p.c. Ord. .	98–100	..	5 0 0
486,090	10	July 15	12	**European, Ltd.**	23½–24	..	5 0 0
354,060	10	"	12	Do. £7 10s. paid	17–17½	..	5 2 11
15,182,590	Stk.	Aug. 13	4/10/8	**Gas-light and Coke** 4 p.c. Ord. . .	100–101	+1½	4 9 9
2,600,000	"	"	3¾	3½ p.c. max. . .	88⅛–89⅛	+1	3 18 3
3,799,735	"	"	4	4 p.c. Con. Pref.	106–107	+½	3 14 9
4,193,975	"	June 12	3	3 p.c. Con. Deb.	85–87	..	3 8 11
258,740	Stk.	Sep. 11	4⅜	**Hastings & St. L.** 3½ p.c.	95–97	..	4 17 11
82,500	"	"	6¼	Do. do. 5 p.c.	113–115	..	5 8 8
70,000	10	Oct. 15	11	**Hongkong & China, Ltd.**	18–18⅜	+⅛	5 18 11
123,500	Stk.	Sep. 11	6½	**Ilford** "A" and "C" .	131–133	..	4 17 9
65,780	"	"	5	Do. "B"	103–105	..	4 15 3
51,000	"	June 26	4	Do. 4 p.c. deb. . . .	103–105	..	3 16 2
4,940,000	Stk.	Nov. 13	8	**Imperial Continental** .	181–183*	..	4 7 5
473,600	Stk.	Aug. 13	3½	Do. 3½ p.c. Deb. Red.	95–97	..	3 12 2
195,242	Stk.	Aug. 27	6	**Lea Bridge Ord.** 5 p.c. .	120–122	+1	4 18 4

Issue	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
561,000	Stk.	Aug. 27	10	**Liverpool United A** . .	226–223	..	4 7 9
718,100	"	"	7	Do. B.	166–168	..	4 3 4
306,083	"	June 26	4	Do. Deb. Stk.	104–106	..	3 15 6
75,000	5	June 26	6	**Malta & Medn., Ltd.** .	4⅜–4⅝	..	6 9 9
560,000	100	Oct. 1	5	**Met. of** 5 p.c. Deb. .	100–102	..	4 18 0
250,000	100	"	4½	**Melbourne** 4½ p.c. Deb.	100–102	..	4 8 3
541,920	20	Nov. 13	3½	**Monte Video, Ltd.** . .	11⅞–12⅛*	..	5 14 3
1,775,892	Stk.	July 30	4/12/6	**Newc'tle & G'tesh'd Con.**	108–110	–½	4 4 1
418,460	Stk.	June 26	3½	Do. 3½ p.c. Deb.	91–93	+1	3 15 3
15,000	10	Aug. 27	10	**North Middlesex** 10 p.c.	20–20½	+⅛	4 17 6
55,940	10	"	7	Do. 7 p.c.	13½–14	+⅛	5 0 0
300,000	Stk.	Apl. 29	8	**Oriental, Ltd.**	141–143	..	5 11 11
60,000	5	Sept. 30	8	**Ottoman, Ltd.**	6¼–6⅜	..	6 5 6
31,800	53	Aug. 27	13	**Portsea Island A** . . .	138–140	..	4 18 6
60,000	50	"	13	Do. B . . .	132–134	..	4 17 0
100,000	50	"	12	Do. C . . .	122–124	..	4 16 9
114,800	50	"	10	Do. D and E .	104–106	..	4 14 4
398,490	5	Oct. 29	7	**Primitiva Ord.**	5⅜–6	..	5 16 8
796,980	5	July 30	5	Do. 5 p.c. Pref. .	5 1/16–5 3/16	..	4 16 5
488,900	100	June 1	4	Do. 4 p.c. Deb. .	96–98	..	4 1 8
1,000,000	10	Oct. 15	8	**River Plate Ord.** . . .	13–13¼	..	6 0 9
312,650	Stk.	June 26	4	Do. 4 p.c. Deb. .	93–95	..	4 4 3
250,000	10	Sept. 30	8	**San Paulo, Ltd.**	14–14½	..	5 12 3
125,000	50	July 1	5	Do. 5 p.c. Deb. .	50–51	..	4 18 0
135,000	Stk.	Sept. 11	10	**Sheffield A**	240–242	..	4 2 8
209,984	"	"	10	Do. B	240–242	..	4 2 8
523,500	"	"	10	Do. C	240–242	..	4 2 8
70,000	10	Oct. 29	10	**South African**	13–13¼	–¼	7 8 2
6,429,895	Stk.	Aug. 13	5/6/8	**South Met., 4 p.c. Ord.**	119½–12⅜	–9	4 8 6
1,895,445	"	July 15	3	Do. 3 p.c. Deb.	85½–86½	..	3 9 4
209,820	Stk	Aug. 31	8	**South Shields Con. Stk.**	152–154	..	5 3 10
05,000	Stk.	Aug. 13	5/6/8	**S'th Suburb'n Ord.** 5 p.c.	117–119	..	4 9 7
60,000	"	"	5	Do. 5 p.c. Pref. . .	121–123	..	4 1 4
117,058	"	July 15	5	Do. 5 p.c. Deb. Stk.	124–126	..	3 19 4
502,310	Stk.	Nov. 13	5	**Southampton Ord.** . .	107–109*	..	4 11 9
120,000	Stk.	Aug. 13	6¾	**Tottenham and Edmonton** A 5 p.c. .	134–136	..	4 19 3
398,940	"	"	5¼	B 3½ p.c. .	106–108	..	4 17 3
149,470	"	June 26	4	4 p.c. Deb.	102–104	..	3 16 11
182,380	10	June 12	8	**Tuscan, Ltd.**	10½–10⅝	..	7 14 3
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	100–101	..	4 19 0
193,742	Stk.	Aug. 27	5	**Tynemouth** 5 p.c. max.	106–108	+½	4 12 7
255,636	Stk.	Aug. 27	6½	**Wandsworth and Putney** B 3½ p.c. . .	128–130	..	5 0 0
79,416	"	June 26	3	3 p.c. Deb. Stk.	74–76	..	3 18 11
845,872	"	Aug. 27	5½	**West Ham** 5 p.c. Ord. .	106–108	+2	4 14 11
185,000	"	"	5	Do. 5 p.c. Pref. . .	120–122	..	4 2 0
228,300	"	June 26	4	Do. 4 p.c. Deb. Stk.	103–105	..	3 16 2

Prices marked * are "Ex div."

philanthropists and lovers of the beautiful, Mr. Hope's invention had a claim on the commercial man, because it reduced the cost of production, and the expenditure necessary for its installation could be recouped in a few months. Dr. George Millson, the Medical Officer of Health for Southwark, and Mr. Macaulay, the Chief Sanitary Inspector for Liverpool, also spoke in approval of the apparatus. Mr. Hope stated that tests for efficiency conducted by experts of the highest authority gave a result of 69·9 per cent. where the apparatus was used with common slack coal, and 67·34 per cent. without it, and using best Welsh coal. He added that any class of boiler could be fitted with his invention.

METROPOLITAN WATER BOARD.

Position of the Capital Account—The Charges in the City.

At the Meeting of the Metropolitan Water Board last Friday, the Finance Committee submitted a report dealing with the position of the capital account on the 30th of September last. The total expenditure on the capital cash accounts during the four years and three months from the transfer to the Board of the Water Companies' undertakings to the above-named date amounted to £3,240,454 12s. 11d.; and the total capital raised by loans or received from other sources during the same period was £3,501,939 15s. 7d.—leaving a balance on the aggregate account of £261,485 2s. 8d. The latter sum is made up as follows: Capital accounts showing a balance in hand, £590,214; do. overdrawn —*i.e.*, expenditure in respect of which no borrowing has been made—£328,729. The first-named sum, which represents the total of the capital cash balances in hand, includes capital receipts amounting to £4202 15s. 3d. The Committee stated that included in the expenditure of £328,729 were various items, amounting to £4535, for which sanction should be obtained to either the raising of loans or the application of capital receipts. The Board accepted the report.

The Appeal and Assessment Committee reported the receipt of a letter from Sir John Bell, Bart., the late Lord Mayor, forwarding copies of the resolutions passed at the Mansion House meeting on the 28th ult. In the course of a long report, the Committee stated that they had given very careful consideration to the points raised in the resolutions, and regretted that they were unable to recommend the Board to take any steps in the direction indicated. They pointed out that the resolutions were directed against the imposition of the Board's maximum water charges in respect of what were termed "business premises;" and they said it might be as well to state at once that, from a water administration point of view, there were only two classes of supplies—domestic and non-domestic—and that it was the character of the user, and not the nature of the premises, which regulated the question of charge. It was the failure to appreciate this circumstance that led to so much misunderstanding in the consideration of the application of the Board's Charges Act. The Committee acknowledged that, following the usual practice in water legislation, the Act provided for what were termed "maximum charges;" but they said that, from the very earliest consideration of the question, it became evident that it would be necessary to impose a 5 per cent. charge, assuming that the Board adopted the proposal to impose one uniform rate in lieu of graduated scales. On the full 5 per cent. basis there was a net deficiency of £21,162 on the whole of the area. The domestic supplies adversely affected were 226, and those benefited were 469, while those undisturbed numbered 271,000. In conclusion, the Committee said they appreciated the moderate tone of the resolutions passed at the meeting in question, and regretted that, for the reasons set forth in the report, they had at the present time no alternative but to recommend—"That Sir J. C. Bell be informed that careful consideration has been given to the resolutions passed at the Mansion House meeting on Oct. 28, 1908, and that, in view of the obligations imposed upon the Board by Parliament, the Board regret that at the present time they are unable to make concessions in the directions indicated." The Board agreed to the report without discussion.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The visit to the Coatbridge Gas Company's works this afternoon proved to be one of the engagements of the Western District of the Scottish Junior Gas Association for which both parties may take unbounded credit. That over a hundred gentlemen should assemble to pay a visit to gas-works argues, on the one hand, that the works are worth seeing, and, on the other hand, that the selection of these particular works was an act of administrative ability. It is impossible to avoid the feeling, which was given expression to by Mr. A. Wilson, that the works had been designed and laid out with great foresight. The works themselves are not ornate—rather the reverse; but there is a nobility in their outlines which is more beautiful than carving and chiselling. One thing is very striking. Although at the time the buildings were erected, before 1877, when Mr. R. Mitchell was transferred to Edinburgh, machinery in retort-houses was unknown, yet at Coatbridge there is ample room for the introduction of any of the types of machinery at present in existence; and there is, as Mr. Wilson, the Engineer, stated, a possibility of some of them being installed. It is a circumstance to be reckoned with by the advocates of methods of working by machinery, that in Coatbridge, where there is not a particle of machinery in the gas-works for the breaking, conveying, elevating, charging, or discharging of coal, or for the handling of coke, it should be possible to sell gas at a cheaper rate than anywhere else in Scotland. It was doubtless this circumstance which made Coatbridge the loadstone to-day. Members of the Association and others were desirous of seeing how it was done. Whether or not any of the visitors found

THE "GAS WORLD" EDITORIAL of Nov. 7th,

when speaking of

THE GAS FIRE TRADE, said

"One result of competition is to increase the difficulty and the responsibility of Gas Companies as regards the selection of Stock Patterns. They (Gas Companies) feeling themselves Trustees for the Gas Consumers, have to be careful not to block the way of real improvements; whilst their own interest as Buyers is opposed to the superfluous multiplication of Stock Sizes and Styles"—

EXACTLY THE REASON

WHY we introduced our

"A.B.C." series of Fires—11 different Sizes, 3 different Designs, and with parts ***all*** interchangeable one with the other. The requirements of any Rooms of a House are met by this Series. Hiring, Hire Purchase, or Sale is made Simple, Safe, and Profitable. If a part is required for renewal you can at once supply without loss of time, confusion, or correspondence. Our Sales are 100 per cent. more this Season and we expect still further success. Write us for supply of our Handsome Booklet, "Warmth in the Home"—just the thing for distribution to Consumers.

Advertisement of the RICHMOND GAS STOVE & METER CO., LTD.

London Offices and Show-Rooms: 132, Queen Victoria Street, E.C. General Offices and Works; Warrington.

out Mr. Wilson's secret remains to be seen; but if they did not it was certainly not his fault, because he freely placed everything within the works before them. He read an admirable statement, giving a history of the rise and progress of the gas industry in the town, which is very interesting reading. The plant within the works has been almost all placed in Mr. Wilson's day, so that for the material he works with, and his methods of working, he is responsible; and for the results he obtains he is entitled to take credit. That he works to good purpose is admitted on all hands; and that his works are such as to well repay a visit to them, was the opinion of all who were present.

It is reported to-day that for some time back the stokers in the Airdrie Corporation gas-works have been dissatisfied with the amount of work they have to do, and that on Thursday morning the whole of them gave notice to leave. Arrangements were being made for the keeping up of the gas supply, when the men agreed to withdraw the notices on condition that the Gas Committee made inquiries in other towns as to the amount of work the stokers are required to perform. The men work in three shifts, of eight hours each. Their grievance is that some time ago the number of charges and discharges they were required to work was increased from 20 to 24 per shift. The charging and discharging is by hand; and the quantity of coal handled per man, with 24 retorts, is 3 tons. The men are to return to the working of 20 retorts till the inquiry has been made.

In order to give employment to men out of work, the Corporation of Kilmarnock have agreed to the proposal made a month ago to proceed with the laying in of the concrete foundation for an extension of the retort-bench, and with the repair of the road into the gas-works. About twenty men are employed; and the cost of the work will be £450.

The Wishaw Town Council had before them on Monday a recommendation by the Gas Committee that no increase should be made in the price of gas. Early in September it was suggested in a minute of the Committee that it might be necessary to raise the price of gas by 5d. per 1000 cubic feet; but the Gas Convener resisted the adoption of the proposal until he had examined the gas accounts for himself. The result was the recommendation brought forward this week. Provost Thomson complained that the suggestion was held by some to have been adopted; and use was made of it in the municipal election. The Council were, however, unable to discover the author of the irregularity; and on Monday they resolved to retain the price at 2s. 11d., as against an amendment that it should be raised to 3s. 4d.

The fifth annual concert and assembly of the Edinburgh and Leith Gas Commissioners' employees was held in Edinburgh last night—Mr. W. R. Herring, the Engineer, in the chair. The Chairman said the Sick and Benefit Society continued to prosper. During the year the income had been £265, and the expenditure £172; leaving a balance of £93. The disbursements for sick allowance amounted to £149. Only about half of the employees of the Commission were members of the Society; and he asked all to consider the benefits it offered. It had been suggested that the Society might fail financially, or that it might be necessary to levy a heavy subsidy upon the members. This point had been brought under the notice of the Commissioners; and they were at present asking Parliament for powers to allow them to contribute to the Sick and Benefit Society of the men. They might rest assured, therefore, that there was no danger of the funds of the Society running out. Another item affecting the welfare of the employees was the institution of an old-age pension scheme on rather different lines from the one now in existence. At the present time, the Commissioners granted pensions which could be withdrawn or reduced at their own will and pleasure. Recently they had thought fit to reduce some of them from 10s. to 8s. This action was not intended to take away from the men what they had already given them; but, in view of the larger scheme of the Government, it was necessary for them to reduce some of the pensions, so as not to prevent the employees obtaining the full benefit of the Government provision. The new pension scheme of the Commissioners was a contributory one, necessitating the payment of 6d. for every sovereign an employee earned in wages. The money went into a fund, and at the end of the year the Commissioners would contribute a sum equal to that paid in by the employees. The scheme was compulsory. Under the new arrangement, an employee who was in receipt of 23s. 4½d. per week would receive, after twenty years' service, a pension of 7s. 9½d. per week. The establishment of the canteen at the Granton works had been a great success. Since last June, when it was opened, they had provided no fewer than 50,000 meals.

Councillor J. T. R. Wilson, the Convener of the Cleansing and Lighting Committee of the Edinburgh Town Council, has prepared and issued to the members of the Council a report on the lighting of common stairs in the city, in which he recommends that within twelve months incandescent gas-burners be substituted for flat-flame burners; that the cost of conversion be capitalized, and be paid off within three years; and that in all new staircases hereafter built the position of the lights be determined by the plan of the staircase, so as to secure the utmost economy consistent with efficient lighting results. The report states that in a number of the newer stairs incandescent electric lamps are used. These are nominally of 5-candle power; but the actual light of the lamp may be taken at four candles. The annual cost of the lamp is £1, for which the Electricity Department supply the wiring, fitting, lamps, and the labour for lighting and extinguishing. The lights in general use are flat-flame gas-burners. These, consuming 1½ cubic feet of gas per hour, give an average light not exceeding three candles, and cost 17s. per annum. The poor lighting re ult is mainly due to dust, which sooner or later chokes up the small hole of the burner. In a few stairs different types of incandescent gas-burners have been used experimentally. These lamps consume one cubic foot of gas per hour, give a light of 15-candle power, and the annual cost is 14s. 6½d. With the flat-flame burners, the annual charge for gas, at 2s. 8d. per 1000 cubic feet, is £8350; and the wages of the stair light extinguishers amount to £2340—together, £10,690. The cost of lighting by incandescent burners is estimated at £9164. This shows an annual saving of about £1500 by the adoption of incandescent burners. The cost of installing the incandescent burners is estimated at £3150. By spreading this amount over three years, a net saving is shown of £500 annually for the first three years, and £1500 annually thereafter.

The Peak Load is in very many Towns falling!!!

Where have increases in Sales to come from?

From Fires and Heating arrangements.

Saturation point is being approached with both Cookers and Slot Meters.

THE

DISCOUNT METER

WILL BE YOUR SALVATION.

Send for Particulars—

T. G. MARSH, 28, DEANSGATE, MANCHESTER.

Out of the list of applicants for the post of Manager of the Kirkintilloch Gas-Works, vacant by the transfer of Mr. James M'Leod to Greenock, the Gas Committee have selected a short leet. The appointment is likely to be made on Friday next. Mr. M'Leod enters upon his duties at Greenock on Monday, the 7th prox.

In September last, the Town Council of Carnoustie resolved to adopt the Burghs Gas Supply (Scotland) Act, with a view to promoting a gas transfer. The second meeting, for confirmation of the resolution, was held on Wednesday; but it was adjourned, pending a conference between the Council and the Directors of the Gas Company.

In the Lanark Town Council last week, a letter from the Secretary of the Lanark Gas Consumers' Company was read, in which it was pointed out that the Manager of the Company thought it was desirable that more of the street-lamps should have meters attached to them, and that he recommended that six new lamps should have meter-boxes. He further pointed out that there was at present no gas-pipe in Bonnington Avenue, where it was proposed to erect two lamps. The Street Committee reported to the Council that they had no objection to meters being placed upon five of the lamps, provided they were supplied and put in at the expense of the Company. The Committee further instructed the Town Clerk to ask the Company to lay a pipe in Bonnington Avenue, in order that the lighting may be carried out there. This was agreed to. The situation is accompanied by this peculiarity—that, the parties not being able to come to terms regarding a transfer of the Gas Company's undertaking, the Council have, for a year-and-a-half now, refused to give them permission to open up the streets. In consequence of this, it has been found next to impossible for the Company to execute repairs upon their pipes, and far more so to extend their business.

Considerable alarm was caused at an early hour yesterday morning by a fire which broke out in the Paisley Gas-Works. It originated in the large fire-proof building in which the oil-gas plant is situated. The flames burst through the roof, doing considerable damage. The fire brigade had the outbreak under control in half-an-hour.

CURRENT SALES OF GAS PRODUCTS.

Sulphate of Ammonia. LIVERPOOL, *Nov.* 21.

The market has been quiet all through the week and at all points, and the tendency of prices has again been in favour of buyers. Supplies have been more in evidence, while, on the other hand, fresh orders have been very scarce; so that at the close the tone is decidedly weak, with quotations at £11 per ton f.o.b. Hull, £11 2s. 6d. per ton f.o.b. Liverpool, and £11 5s. per ton f.o.b. Leith. The forward position has been neglected, and January-March continues to be offered by makers at £11 11s. 3d. to £11 10s. per ton f.o.b., according to port.

Nitrate of Soda.

This article is slightly firmer at 9s. 7½d. per cwt. for 95 per cent., and 9s. 10½d. for refined quality, on spot.

Tar Products. LONDON, *Nov.* 23.

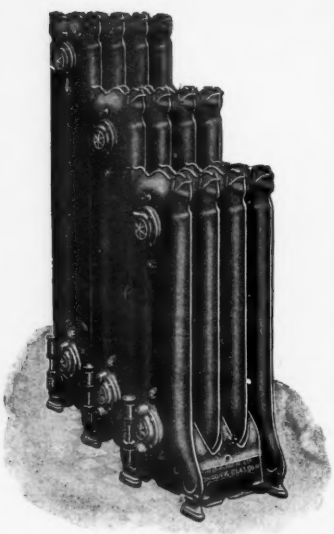
The markets for tar products continue in about the same position. Pitch appears to be easier almost daily, and there is decidedly more disposition on the part of manufacturers to meet the offers made them by dealers. Business on the Continent is still very difficult to negotiate, and the majority of buyers seem to be out of the market for the present season. In South Wales also the consumers are apparently well covered to the end of March, and will only buy to the end of April onwards at low figures. Creosote is very firm. In London, there are practically no sellers for prompt delivery; while for forward they are in the majority of cases asking 3d. per gallon. In the Midlands, a fair business has been done at 2¾d.; while in the North, 2⅞d. to 2¾d. has been accepted. Benzol is very quiet; and any reasonable offer for delivery between now and the end of June next meets with consideration on the part of the maker. Benzol, 59-90 per cent., is firm, particularly in the North, where there appears to be a good demand for this article. Toluol also is being inquired for; and makers report having received numerous offers for delivery all over next year at fair prices. Solvent naphtha is steady, and good figures are reported in the Midlands and the North. Heavy naphtha is firm; but there is not much business doing. Carbolic remains weak, and Continental consumers continue to report purchases at low figures. Naphthalene is depressed; while salts do not command a ready sale.

The average values during the week were: Tar, 11s. 9d. to 15s. 9d. *ex* works. Pitch, London, 20s. 3d. to 20s. 6d.; east coast, 19s. 6d. to 20s.; west coast, 19s. 6d. to 20s. 6d. f.a.s. Mersey; 18s. 6d. to 19s. f.o.b. others. Benzol, 90 per cent., casks included, London, 7d.; North, 6¾d. to 6⅞d.; 50-90 per cent., casks included, London, 7¾d. to 8d.; North, 8d. to 8¼d. Toluol, casks included, London, 9d.; North, 8½d. Crude naphtha, in bulk, London, 3⅜d. to 4d.; North, 3½d. to 3¾d.; solvent naphtha, casks included, London, 11½d. to 11⅝d.; North, 10½d. to 10⅝d.; heavy naphtha, casks included, London, 11d. to 11¼d.; North, 10d. to 10½d. Creosote, in bulk, London, 2⅝d.; North, 2⅝d. to 2¾d. Heavy oils, in bulk, 3 1/16d. to 3⅛d. Carbolic acid, 60 per cent., east coast, 1s. 0½d. to 1s. 0⅝d.; west coast, 1s. to 1s. 0⅛d. Naphthalene, £3 10s. to £6 10s.; salts, 32s. 6d. to 35s. Anthracene, "A" quality, 1½d. to 1⅝d.

Sulphate of Ammonia.

This article has been rather easier throughout the past week, and the premium of the market appears to be in favour of buyers. The Gas Companies still maintain their price of £11 15s. for January-June delivery, but would probably consider a counter-offer. For prompt delivery, outside London makers are selling on Beckton terms at £11 to £11 2s. 6d. In Hull, the market value may be taken at £11 1s. 3d. to £11 2s. 6d.; and in Liverpool about £11 3s. 9d. In Leith, the market is nominally £11 5s. to £11 7s. 6d.; but very little business is possible at this port. Makers are very well sold for delivery to the end of the year; while the majority of the dealers who have stuff to receive require it for their own purposes, and would not sell unless they could obtain a fair figure.

RADIATORS



PLAIN OR ORNAMENTAL.

WHEN A TRAVELLER TELLS YOU HE IS SELLING THE BEST RADIATOR, YOU MAY BE SURE THAT IT IS

THE "ST. MUNGO" GAS HEATED STEAM RADIATOR

HE IS TALKING ABOUT.

FITTED WITH GAUGE GLASS,
GAUGE GLASS PROTECTOR,
GAS & AIR ADJUSTER,
AUTOMATIC AIR VALVE.
AUTOMATIC GAS REGULATOR,
FIXED CAST-IRON BASE,
AND ALL THAT IS BEST
IN RADIATOR CONSTRUCTION.

HIGHEST GRADE.

R. & A. MAIN, Ld.,

LONDON, GLASGOW, FALKIRK.

COAL TRADE REPORTS.

Northern Coal Trade.

The demand for coal has been rather unequal—that for steam kinds being less, while gas coals show increased requirements. The steam coal trade is thus a little easier in price—best Northumbrians being from about 11s. to 11s. 3d. per ton f.o.b., for prompt delivery. Second-class steams are from 9s. 9d. to 10s. 6d.; and for steam smalls there is a fair demand, at from 4s. 9d. to 6s. The production is full; but for forward delivery buyers look for some concessions in price. In the gas coal trade, the demand is, of course, now very heavy. For best gas coals, the price is steady; while for other qualities it is rather easy—the quotation being from 9s. 3d. to 10s. 3d. per ton f.o.b., with the usual addition for "special Wear" classes. No large contracts are reported; but some sales for the Mediterranean ports are believed to have been effected, for next year's delivery, at prices that are a little higher than those for early delivery above given. Coke is steady; but gas coke is more plentiful, and may be now quoted as from 15s. to 16s. per ton f.o.b. in the Tyne or Wear.

Scotch Coal Trade.

The market is steady, with but little change, prices being, if anything, easier. There is an abundance of ell. Splint is in better demand. Steam coal is in poor request. Smaller sorts are being better looked after, particularly treble and double nuts. The prices quoted are: Ell, 10s. to 11s. per ton f.o.b. Glasgow; splint, 10s. 9d. to 11s.; steam, 10s. to 10s. 3d. The shipments for the week amounted to 293,625 tons—a decrease of 25,540 tons upon the previous week, but an increase of 1913 tons upon the same week of last year. For the year to date, the total shipments have been 12,888,085 tons—a decrease of 132,453 tons upon the corresponding period.

NEW CATALOGUES, &c.

The show-card, when attractive enough to be certain of catching first the eye and then the attention, is an effective form of advertising; and the requirement mentioned is fairly met in a new card which the Carron Company have prepared, illustrating a gas-fire, a gas-heated steam-radiator, and a gas-boiler.

The Chain Belt Engineering Company, of Derby, forward a copy of Booklet No. 101, dealing with modern money-saving plants applied to the economical handling of coal, coke, and other materials at collieries and gas-works. There are a number of illustrations of the firm's specialities, and of installations in various gas-works and collieries, as well as of plants erected by the Link Belt Company, of Philadelphia and Chicago, with whom, it is stated, the Chain Belt Company "have had an interchange of ideas and experience for many years." The pamphlet, which is of waistcoat pocket size, contains much that is of interest to all who are in any way concerned with the saving of labour in gas-works.

As pretty a booklet as can well be imagined—and that is saying a good deal, in these days of elaborate colour printing—has just been issued by Messrs. Mansfield and Sons, Limited, of Derby Square, James Street, Liverpool. It is "On Lighting," and deals in a chatty manner with the advantages claimed for their oil-gas system. The apparatus is one that easily adapts itself to particular circumstances, for it is stated that plants are now working which are making gas from tallow, palm oil, cocoanut oil, earth oil, castor oil, and paraffin. The firm demonstrate the absolute confidence they have in their system by offering to remove free of all costs whatever any plant they may instal which does not fulfil what they claim for it. To return to the booklet, few people who open it will be able to lay it down again without going over all the pages—if only for the sake of the coloured pictures which illustrate the lighting of various rooms and give views of mansions, streets, &c., in which the Mansfield system is at work.

Sales of Stocks and Shares.

At the Mart, Tokenhouse Yard, E.C., last Tuesday, Messrs. A. & W. Richards offered for sale, under instructions from Directors, 350 "G" 7 per cent. ordinary £10 shares and a like number of "G" 5 per cent. preference shares of similar nominal value in the Aldershot Gas and Water Company, and 2500 ordinary £10 shares, ranking for a dividend of 7 per cent., in the Alliance and Dublin Consumers' Gas Company. The ordinary shares in the Aldershot Company fetched from £14 5s. to £14 7s. 6d. each, and the preference shares from £11 17s. 6d. to £12 each; the Dublin and Alliance Company's shares selling at from £12 5s. to £13 10s. apiece. In response to the invitation recently contained in our advertisement columns, tenders to the amount of £53,528 were submitted for the £20,000 of "D" water stock offered by the Barnet District Gas and Water Company. The minimum price fixed was £102 10s.; and the stock was allotted at an average of £107 1s. per £100. At a recent sale conducted by Messrs. W. Day and Sons, in conjunction with Messrs. Tootell and Green and Mr. Walter Cox, by order of the Directors, £5000 of 5 per cent. capital stock and £4000 of 3 per cent. debenture stock of the Maidstone Gas Company was quickly disposed of; the former fetching from £140 to £142 and the latter from £71 to £73 per £100.

According to a letter in the "Financial News," written on behalf of Mrs. M. Bernard, the wife of the man recently sentenced to one year's penal servitude for his association with Gyde in the Welsh Quarries case, the matter is to be taken to the Court of Criminal Appeal. The writer of the letter says: "Gyde and Darby were the real instigators of the frauds. Marcus Bernard, although acting as Secretary at the launching of the Companies, very soon afterwards resigned his berth, waiving £5 salary weekly to hunt for an honest occupation."

RADIATOR SCIENCE.

No. 2.

A Remarkable Test by a Public Official, disposing, once and for all, of the suggestion that the Automatic Valve is a Safety Valve.

The Mistake. It has been occasionally suggested that the Automatic Valve on Gas-Heated Steam Radiators is really a Safety Valve to prevent some imaginary danger attending their use.

Its Cause. The idea is not merely unscientific—it is absurd; and, naturally, it arises from a lack of even an elementary knowledge of Radiator Science.

The Answer. When this suggestion has been put to ourselves, we have quickly cleared up the point by *stating the plain scientific fact*, and describing a certain interesting Official Trial attesting it.

The Scientific Fact. The radiating surface of the "St. Andrew" is of set purpose so enormously in excess of the surface exposed to the heat, that no more than a few pounds pressure can be got *even when tried with the Automatic Valve removed.*

The Official Test. Some years ago, the *Chief Engineer* of one of the *leading Public Bodies in the Kingdom* had this test carried out, on a "St. Andrew" Radiator taken from stock:

(1) A Steam Pressure Gauge was connected to the Radiator.

(2) *The Automatic Valve was taken off altogether.*

(3) A cover was placed over the apparatus to *prevent loss of heat by radiation.*

(4) Beneath and around the lower part of the Radiator were connected up and lit as many powerful atmospheric burners as could be found room for. These *extra burners*, and the Radiator's own burner, were all *consuming their maximum consumption* of gas, at *an 8-inch pressure.*

The Triumphant Issue. After the Radiator had been *for hours* subjected to this *fierce furnace heat*, the Engineer pronounced it absolutely impossible to create more than a few pounds pressure in the Radiator, *although the Automatic Gas Regulating Valve had been removed*, and, having already seen that each loop sent out by us was tested under heavy hydraulic pressure, at once authorized the use of the "St. Andrew" in the public buildings under his control.

Automatic Valve a sine qua non for economical heating. This result confirmed our claim that an Automatic Valve in a Gas-Heated Radiator was absolutely unnecessary, except for the purpose of *economically controlling the gas consumption.*

This disposes, once and for all, of the suggestion that the Automatic Valve is a Safety Valve.

JOHN WRIGHT & CO.,
Radiator Experts,
Essex Works, Birmingham.

Electric and Gas Lighting at Hounslow.

At a Local Government Board inquiry recently held at Hounslow, with respect to an application made by the District Council for permission to borrow £7088 for work and appliances for the electricity undertaking, the Inspector (Mr. H. R. Hooper, M.Inst.C.E.) remarked that he could never get a definite opinion on incandescent gas lighting from those interested in an electric light undertaking; and he asked to be supplied with the number of cubic feet of gas burnt per hour in each of three incandescent gas-lamps situated (with a number of arc lamps) in a length of the Bath Road in which it was proposed to put ten additional arc lamps. The Surveyor said he thought it was 6 cubic feet; but the Inspector said he considered 20 cubic feet would have been nearer the mark. The Clerk stated that the cost of lighting the arc lamps was £4 each, and that of the gas-lamps £3 1s. 8d. each for 60 candle power. Looking into the relative figures concerning gas and electricity, the Inspector remarked that electricity meant that they were given less light and were charged more for it. The Chairman of the Electric Light Committee replied that it was only since the electric light had been introduced that the gas had improved. Mr. Pace, as a private ratepayer, said he strongly objected to the loan, as the undertaking had been a losing game from beginning to end, and the light was not so good as that from gas. In reply to questions, the Clerk admitted that there was no sinking fund for the depreciation of the machinery. Several items of the proposed loan were struck out.

Lead Service-Pipes for House Connections.

In a recent number of "Engineering Record," reference was made by a correspondent to the use of lead service-pipes for house connections; and in a note to the letter the Editor stated that this kind of pipe was in almost general use, as the fear of lead-poisoning by water passing through it had practically disappeared. This statement brought a letter from another correspondent, in Massachusetts, who pointed out that at Lowell two sources of ground water had been abandoned because of its action on lead pipe; while in Lawrence it was found advisable to extend the filters for purifying the Merrimack River supply rather than use a ground-water supply which would attack lead. It appears that in the towns of Kingston, Fairhaven, Milford, and Norwood it has been necessary to take out a large number of lead pipes owing to some cases of poisoning; and the water company at Milton have been obliged to pay damages on account of it. This experience has all been within a few years; but, as a result of it, in very few, if any, of the new water-works systems in Massachusetts are lead service-pipes being used. A few years ago an investigation was made by the State Board of Health which showed that lead or lead-lined pipes were used almost exclusively in only 28 cities and towns, cement-lined pipes for services in 34, and galvanized iron in 65. These facts are important, as showing that where the character of water is kept under careful observation, as it is in Massachusetts, the danger of poisoning by the lead dissolved by the water, particularly in the case of supplies drawn from wells or other ground sources, is considered much greater than is commonly supposed. Our contemporary believes, however, that most water supplies throughout America have not shown any such effect on lead, and of those where the action has been observed the water was obtained in most cases from wells. There can be no question, however, that the use of wrought-iron or cement-lined pipe avoids the danger of poisoning; and they should be employed if there is any probability that the water will act on lead.

Public Lighting of Dublin.—The following notices of motion for a meeting of the Dublin Corporation Lighting Committee last week were given by Mr. D. M. Doyle: "(1) That the City Electrical Engineer be asked to, within the life of the present Committee, bring up an estimate of the cost of substituting electric incandescent light for gas in all the streets of the city now lighted by gas and in which no electric mains are now laid. (2) That Mr. Ruddle be asked to arrange at an early date with Mr. M'Carthy, Dr. Ryan, of the Technical Schools, or with Mr. O'Donohoe, Teacher of Light and Shade Drawing, or with all three, if they are willing to oblige the Committee, to inspect the public statues during the street lighting hours, for the purpose of reporting what alterations are necessary in the arrangement of lamps whereby the statues would be lighted in an artistic manner, instead of the present unsightly and very inartistic effect—the base of each statue being brilliantly lighted, while the top or figure portion is in almost complete darkness—and to consider whether the many ill-designed lamps now in use could not with advantage be superseded by a neatly-designed lamp properly placed, and having an opalescent globe, near each statue.

Fatal Accident at the "National" Gas-Engine Works.—An inquest was held yesterday week at Ashton on the body of Richard Speaks, who was employed by the National Gas-Engine Company as a millwright. From the evidence, it appeared that six men, including deceased, were engaged in lowering a gas-main into a trench inside the works. The deceased was acting as foreman. The main was 39 feet in length, and had an outer diameter of 13½ inches. It weighed from 1 to 2 tons; and for lifting it they had three 1-ton blocks. The end blocks were fastened to planks, which had one end resting on the floor and the other end reared against the wall. The middle one was fastened to an overhead gas-main, about 14 feet from the ground. They had just commenced to lower the pipe, when the main broke and fell. On reaching the ground, it broke again, and one of the pieces fell on the deceased, and pinned him to the ground, fracturing his skull and causing him other injuries. Mr. W. Wood, the Works Manager, said he did not consider the blocks had been put in the proper place; and the Coroner remarked that deceased should have had more sense than to do as he had done. A verdict of "Accidental death" was returned. At the conclusion of the inquest, Mr. H. N. Bickerton, a Director, expressed his sympathy with the widow and family, and said the Company had lost a most capable servant. Deceased was a man of exceptional ability; and such complete confidence was placed in him that anyone would have hesitated before giving him advice. He was always allowed all the apparatus and assistance he needed. He did not wish to cast any reflection on him.

The Parkinson Gas-Heated Steam Radiator

Replete with all Latest Improvements.

May we send you a supply of our Illustrated Booklet

"WARMTH WITHOUT WASTE"P

The Parkinson Stove Co., Ltd., Birmingham.

Fatal Gas Explosion at Reichenbach.—According to a Reuter telegram sent from Plauen (Saxony) on the 18th inst., an explosion occurred that morning in the retort-house at the Reichenbach Gas-Works, as the result of which two men were killed and three severely and five slightly injured. It is stated that a disaster of a much more serious nature was only prevented by the speedy action of Herr Selling, one of the managers, who turned off the main valve, though while doing it he was severely injured.

Theft of Coal at Walton-on-Thames Gas-Works.—At Kingston, last Thursday, Edward Ellis, Thomas Alexander, and David Skilton were summoned for having stolen, on the 8th inst., a quantity of coal, value 8d., the property of the Walton-on-Thames and Weybridge Gas Company. Evidence was given by P.S. Tytherleigh, who, in consequence of information received from the Manager of the gas-works, watched in a field at the rear of the works at 5 a.m. Mr. Thomas Price, the Manager, said defendants had been at the works for some years, and had hitherto borne good characters. Defendants pleaded guilty. Answering the Chairman, Mr. Price stated that defendants had since been dismissed from their situations by the Company. The Chairman said that, under these circumstances, defendants would each be fined 5s.

Belfast Gas-Works Site.—Owing to the unavoidable delay in coming to a final decision with regard to the new gas-works site, the Belfast Gas Committee have apparently abandoned the idea of promoting a Bill in the next session of Parliament. A meeting of the Council to consider the matter had been summoned for last Tuesday; but this was postponed *sine die*, in order that all the figures relating to the various proposed sites might be printed and further considered. The Gas Manager (Mr. R. Sharpe) expressed the opinion that nothing would be lost by not proceeding with the Bill this year, as the preliminary work which would have to be carried out before the extension could be commenced would occupy several months; and he therefore thought it would be advisable for the Committee to proceed at present with the selection of a site for the new works, and have matters in readiness for the promotion of a Bill next year.

Newtownards and the Lighting of Comber.—As the result of an interview with the Directors, the Comber Lighting Committee of the Newtownards Rural District Council ascertained that the Comber Gas Company were not in a position to sell gas to the Council for the public lighting of Comber, owing to the fact that they had not a Provisional Order or Act of Parliament authorizing them to do so. As the probable cost of securing an Order would be over £100, and the dividends for a year only amounted to £90, they asked whether, as the Order would be solely for the accommodation of the lighting authority, the Council would agree to contribute a portion of the outlay. It having been pointed out that they could not do this, the Committee decided on a form of agreement to be drawn up regulating the charges for public lighting, to remain in force for ten years from Nov. 1, 1909, provided that the Company are successful in obtaining an Order within a year.

According to a letter in the "Daily Express" from Mr. Isaac Lyons, the Secretary of the Anti-Socialist Union, whose objects were noticed in the "JOURNAL" last week, he has received a large quantity of correspondence from persons in all parts of the country who are desirous of joining the new organization.

The Havant Gas Company have just secured an additional outlet for their product, and the development of a large adjoining district is more than likely to prove a good source of revenue. The Parish Council of Bedhampton have resolved upon adopting public lighting, and the Directors of the Gas Company have secured the contract, at £3 17s. 6d. per lamp. The Farlington racecourse and railway station are adjacent to the parish; and as building is rapidly proceeding, the outlook for the Company is decidedly encouraging.

At the annual meeting of the Castner-Kellner Alkali Company last Thursday, Mr Gerald Balfour, who presided, announced the inauguration of a scheme of profit-sharing. It was begun tentatively, he said, by paying bonuses to the responsible members of the staff; and during the current year it had been extended to all the employees. The bonuses were calculated in relation to the dividend distributed to the shareholders. It was too early to say how the plan would work; but he hoped at the next meeting to be able to report that the experiment had succeeded.

At the London Bankruptcy Court last Tuesday, the first meeting of creditors was held under the failure of Mr. Ivan Rhydderch Davies, of Lauderdale Mansions, Maida Vale. Debtor was adjudicated bankrupt in 1894, and had since been employed as a commission agent, largely in connection with mining and lighting companies. He is now Manager of the Mansions Consolidated, Limited. In 1898 he and others formed the Voelker Company, received £6000 in shares, and he became Managing-Director at a salary of £1000 per annum. This position he resigned twelve months later. He attributed his failure and insolvency to losses in connection with the flotation of companies. No statement of affairs had been filed; but proofs of debts to the amount of £7135 were dealt with. In the absence of any offer, the case was left in the hands of the Official Receiver.

At to-day's meeting of the London County Council the Public Control Committee will report the result of tests with a portable photometer of the illuminating power of the gas of the South Suburban Gas Company in the districts of Forest Hill and Honor Oak Park, during the two weeks ended the 31st ult. The tests were made on seven occasions at several of the Council's elementary schools in the neighbourhood. The highest result, 14·24 candles, was obtained at the schools in Kilmorie Road, Forest Hill, and Stillness Road, Honor Oak Park, on Oct. 29 and 30; and the lowest, 12·67 candles, at the school in Woodland Road, Gipsy Hill, on Oct. 26. The average of the seven sets of testings was equal to 13·29 candles, or nearly 0·75 candle below the standard. The Committee have communicated these facts to the Lewisham and Lambeth Metropolitan Borough Councils, and have also informed the Education Committee of the result of the tests.

FOR GAS CONSUMERS.

A SIMPLE BASIS OF COMPARISON OF THE

COST OF ELECTRIC AND GAS LIGHTING.

[*For Specimen, see page 476 of last week's issue.*]

Gas Managements requiring this simple Basis of Comparison of the cost of Electric and Gas Lighting can (by sending the local Prices of Gas and Electricity for Lighting Purposes for the conversion of the figures at the foot of the Table) have it printed on Post Cards, Plain Cards for distribution with accounts, or on Gummed Paper for affixing to Meter Index Cards or in other convenient position.

Prices for Quantities on Application to WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

WORKS SUPERINTENDENT. Birmingham Gas Department. Applications by Nov. 28.
MANAGER. Abertillery Gas Department. Applications by Dec. 1.
CHIEF ENGINEERING DRAUGHTSMAN. Belfast Gas Department. Applications by Dec. 3.
WORKS MANAGER (GAS STOVE TRADE). No. 5024.
TEACHER OF WORKSHOP ARITHMETIC AND MECHANICAL DRAWING. London County Council Technical School. Applications by Nov. 30.
NIGHT FOREMAN. No. 5018.
STOKER. Beaumaris Gas Works.

Situations Wanted.

CHEMICAL PLUMBER AND LEAD BURNER. Davies, Shepherd's Bush.
REPRESENTATIVE (IRON OR COAL FIRM). No. 5025.

Ross on "Air as Fuel," &c.

COPY OF 1875 EDITION WANTED. 9, Agnew Street, Lytham.

Plant, &c. (Second-Hand), for Sale.

LAMP COLUMNS. Stoke-on-Trent.
WASHER-SCRUBBER. Locomotive Superintendent, Midland Railway, Derby.

Patents for Disposal and Licenses to Work.

LIGHTING AND EXTINGUISHING DEVICE. Haseltine, Lake, and Co., Southampton Buildings, W.C.

Stocks and Shares.

DERBY GASLIGHT COMPANY. Dec. 9.
HERTS AND ESSEX WATER COMPANY. Dec. 18.
LANCS. STATUTORY GAS COMPANY. No. 5023.
WALKER AND WALLSEND GAS COMPANY. Dec. 2.

TENDERS FOR

Coal.

RHONDDA GAS AND WATER DEPARTMENT. Tenders by Dec. 3.

Fire-Clay Goods.

BRADFORD GAS DEPARTMENT. Tenders by Dec. 10.

Sulphuric Acid.

SALFORD GAS DEPARTMENT. Tenders by Dec. 3.

OXIDE OF IRON.

O'NEILL'S OXIDE
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

SPENT OXIDE PURCHASED IN ANY DISTRICT.

GAS PURIFICATION & CHEMICAL CO., LD.,
PALMERSTON HOUSE,
OLD BROAD STREET, LONDON, E.C.

WINKELMANN'S

"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for GAS-WORKS.
ANDREW STEPHENSON, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

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ANY QUANTITY. ANY PORT. ANY STATION.

DONALD M'INTOSH,
110, CANNON STREET, LONDON.

PINCHBECK'S Meters and Burglar PROOF STRONG BOX.
See illustrated advertisement, Nov. 10, p. I. of Centre.
PINCHBECK LIMITED, Adams Place, George's Road, HOLLOWAY, N.

OXIDE OF IRON.
(NATURAL.)
SPENT OXIDE PURCHASED.
BALE'S FIRE CEMENT.
PAINT FOR GAS-WORKS.

BALE & CHURCH,
5, CROOKED LANE, LONDON, E.C.

SULPHURIC ACID.

SPECIALLY prepared for the Manufacture of SULPHATE OF AMMONIA.
SPENCER CHAPMAN & MESSEL, LTD.,
with which is amalgamated WM. PEARCE & SONS, LTD.
36, Mark Lane, LONDON, E.C. Works: SILVERTOWN.
Telegrams: "HYDROCHLORIC, LONDON."
Telephone: 341 AVENUE.

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No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

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All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C
Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

ROBERT DEMPSTER & SONS, Ltd., Contractors for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, ROSE MOUNT IRON-WORKS, ELLAND.

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CARBURINE FOR GAS ENRICHING.
ALSO
THE MAXIM PATENT CARBURETTOR.
For Prices, &c., apply to
THE GAS LIGHTING IMPROVEMENT CO., LTD.,
7, BISHOPSGATE STREET WITHOUT,
LONDON, E.C.
Telegraphic Address: "Carburine, London."

DESSAU PATENT VERTICAL RETORTS.
FOR list of Installations, see "Journal," Nov. 3, p. I. of Centre.
THE DESSAU VERTICAL RETORT COMPANY,
Care of Mr. CHARLES HUNT, Consulting Engineer,
17, Victoria Street, WESTMINSTER, S.W.

FIDDES-ALDRIDGE
SIMULTANEOUS Discharging-Charger. The one Machine which Discharges and Charges at One Stroke.
See Advertisement, Nov. 17, p. III. of Centre.
ALDRIDGE AND RANKEN,
9, VICTORIA STREET, WESTMINSTER, S.W.
Telegrams: "MOTORPATHY, LONDON." Telephone: 5118 WESTMINSTER.

"NUGEPE" GAS PLANT CEMENT.
JOHN E. WILLIAMS AND CO.,
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For all Joints in connection with Oil-Gas Plant and Sulphate Plant.
For all Gas Joints.
For all Tar Joints.
For all Ammonia Joints.

GAS TAR wanted. BROTHERTON AND CO., LTD., Tar Distillers. Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, WAKEFIELD, AND SUNDERLAND.

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SPECIALLY prepared for Sulphate of AMMONIA Makers by
CHANCE AND HUNT, LIMITED,
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Telegrams: "CHEMICALS, OLDBURY."

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MEADE-KING, ROBINSON, & CO. Represent the Strongest Independent Refineries in America; also Petroleum Spirit for Gas Enrichment. 18, EXCHANGE STREET, MANCHESTER, and 11, OLD HALL STREET, LIVERPOOL.

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LUX'S GAS PURIFYING MASS. See Advertisement on p. 531.
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SULPHATE OF AMMONIA SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants.
We guarantee promptness, with efficiency for Repairs.
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Gives no back Pressure.
The Cheapest in the Market.
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TO Gas Managers, &c., Wanted, Old Condemned GAS-METERS, from 1-light to 1000-light, for destruction to re-claim Metals. Write for Prices, Stating Quantities and Sizes, and if Wets or Drys. Scrap Metals, Drosses, Metal Shop Sweepings, &c., also bought.
J. WILSON, Pleasant Grove, York Road, King's Cross, LONDON, N.

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It is also used for the enrichment of Gas.
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Telegrams: "DORIC," Newcastle-on-Tyne. National Telephone No. 2497.

A GAS Engineer, member of the Institution of Gas Engineers, well known in Southern and Western Counties, is open to Treat with First-Class Iron or Coal firms as direct REPRESENTATIVE.
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Apply, by letter only, stating Age, Experience, Salary required, &c., to No. 5024, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

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WANTED, immediately, an Experienced General Carbonizing and Works NIGHT FOREMAN, for a Works producing 500-Millions per Annum. One who thoroughly understands Machinery as used in Gas-Works, and who should have held a similar Appointment elsewhere. House, Coke, and Gas Free.
Apply, by letter only, stating Age, Wages, &c., required, together with *copies* of recent Testimonials, to No. 5018, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

URBAN DISTRICT COUNCIL OF ABERTILLERY.
(GAS-WORKS DEPARTMENT.)

APPOINTMENT OF GAS MANAGER.

THE above-named Council invite APPLICATIONS, from duly qualified Gas Engineers, for the Position of MANAGER of their Gas-Works Undertaking.

The Annual make of Gas is about 55 Million Cubic Feet; and the Salary offered is at the rate of £200 per Annum.

The person appointed must undertake the Sole Management of the Gas Undertaking, both as regards the Making and Distribution of Gas, and be accustomed to the working of Regenerative Furnaces and Sulphate of Ammonia Plants.

Office and Storage accommodation will be provided at the Gas-Works.

Applications, stating Age, Experience, and enclosing Three recent References, to be sent to the undersigned not later than noon of Tuesday, the 1st of December, 1908.

Canvassing the members, either in a direct or indirect manner, will disqualify a Candidate.

By order,
WILLIAM GAIT,
Clerk to the Council.

Council Offices, Abertillery,
Nov. 17, 1908.